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A METHOD FOR WASTEWATER TREATMENT SYSTEM USER COST
ALLOCATION. VOLUME 2. USER'S MANUAL. 1982.

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A Method for Wastewater Treatment System User Cost Allocation

Volume 2

User's Manual

Economic and Technical Review
Report EPS 3-WP-80-7E

Water Pollution Control Directorate
February, 1982

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A METHOD FOR WASTEWATER TREATMENT SYSTEM USER COST ALLOCATION

Volume 2

User's Manual

by

Edna B. Boisselle and Pierre Côté,
Barré, Pellerin, Lemoine Inc.

for the

Environmental Protection Service
Environment Canada

Report No. EPS 3-WP-80-7E
February 1982

REVIEW NOTICE

This report has been reviewed by the Water Pollution Control Directorate, Environmental Protection Service, and approved for publication. Approval does not necessarily signify that the contents reflect the views and policies of the Environmental Protection Service. Mention of trade names or commercial products does not constitute recommendation or endorsement for use.

English translation of original French report "Méthode de tarification en épuration", Volume 2, Manuel de l'utilisateur, Environnement Canada, Ottawa, 1980.

ABSTRACT

This manual contains the information required to use the TAREP (Tarification en épuration) program to establish a distribution of costs for wastewater treatment, including instructions for coding data, a description of the TAREP subroutines, the program in FORTRAN taken from a run on the University of Montreal's CYBER 173, and the results of that run.

TAREP is applicable in municipalities where there is joint treatment of industrial and municipal wastewaters. It can be used to establish charges to ratepayers where treatment facilities are already in operation, and it can also be used in the course of preliminary studies leading to the construction of such facilities, enabling municipalities and users to decide whether joint treatment is economically worthwhile.

Volume 1 of the TAREP study describes the principles underlying TAREP and case studies using the program.

RÉSUMÉ

Ce guide contient les renseignements nécessaires à l'utilisation du programme TAREP (tarification en épuration) qui permet d'établir une ventilation des coûts du traitement des eaux usées. Il comprend des instructions sur le codage des données, une description des sous-programmes TAREP, le programme FORTRAN obtenu d'une unité de traitement du CYBER 173 de l'Université de Montréal et les résultats de ce passage dans l'ordinateur.

Le programme TAREP est applicable dans des municipalités où on traite ensemble les eaux usées industrielles et urbaines. Il peut servir à facturer les abonnés dans les municipalités déjà pourvues d'installations de traitement et il peut être utilisé au cours de l'avant-projet des installations de ce genre car il permet de déterminer la rentabilité du traitement en commun.

Le volume 1 décrit les principes fondamentaux du programme et présente des études de cas effectuées avec ce dernier.

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1 THE TAREP PROGRAM

1.1 The Files (see Figure 1)

1.1.1 Input files. File 1 holds general data on treatment facilities: current and design flows; expected contaminant loads; breakdown of costs among facility design factors; and, construction and operation and maintenance costs.

File 2 holds industrial ratepayer profiles: land area, property valuation, type of sewer, current water quality data and expected future quality.

File 3 holds profiles for categories of ratepayers.

File 4 holds profiles for individual ratepayers.

1.1.2 Output files. File 5 is a transcript of the data input, for verification purposes.

File 6 is a tabulation of data input to and generated by TAREP; the percent allocation of costs to users, property and reserved future use; the allocation of annual costs; the number of each type of ratepayer; the basis of charges to property; the unit costs; and the total costs and total bills.

Invoices of costs allocated to industrial ratepayers are contained in file 7, while file 8 and 9 hold invoices produced for categories of ratepayers and individual ratepayers, respectively.

1.2 Description of Data

Certain of the input data are described below to enable the user to become familiar with their interpretation and the acceptable variations. The program offers a number of options which can be used or neglected according to the requirements of the case under study. The data described below will also assist the user in choosing options.

A list of the data that must be provided and the appropriate format is provided in Appendix 1. A complete example application of TAREP is provided in Appendix 2.

FORTAN terminology is shown in parentheses.

TAREP

INPUT FILES

OUTPUT FILES

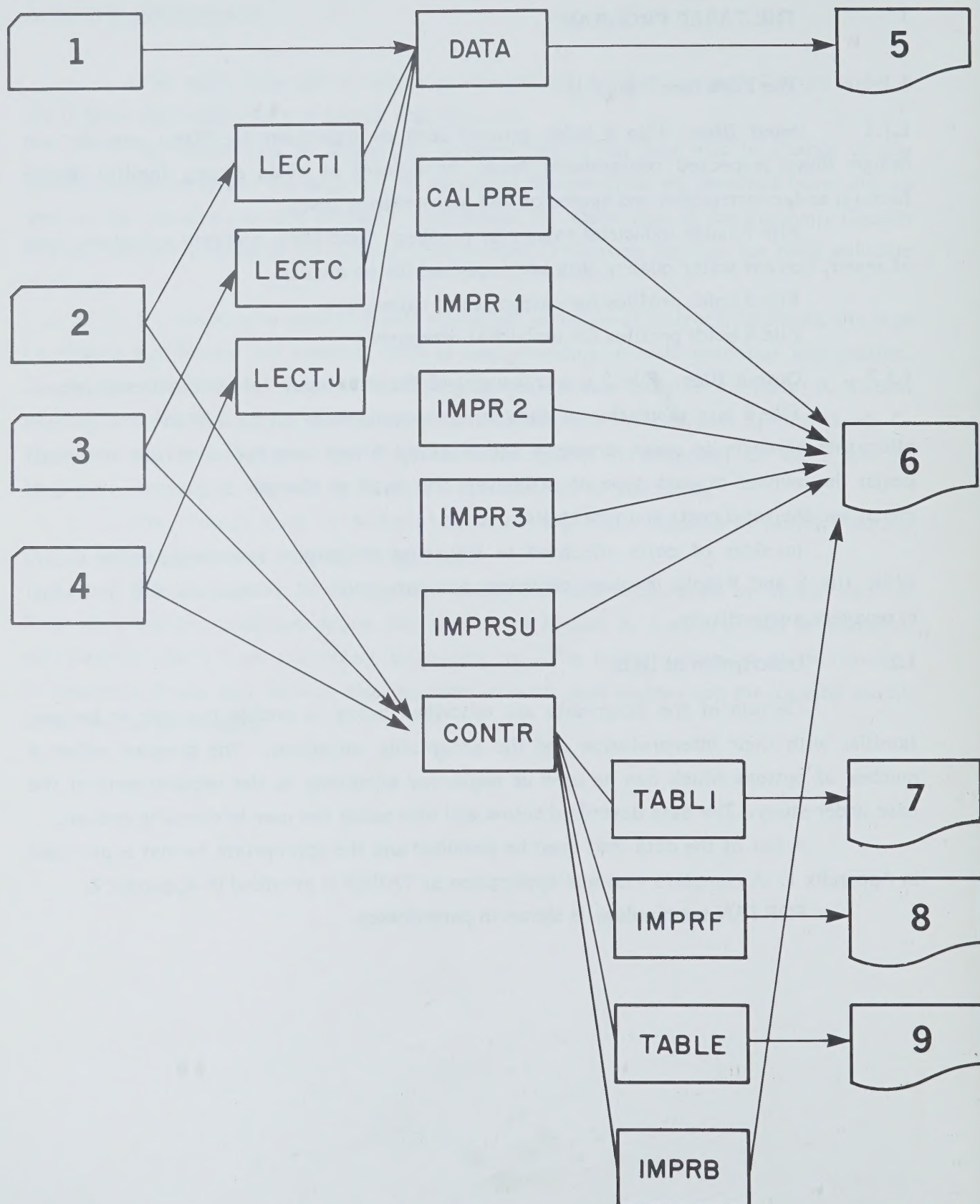


FIGURE 1

TAREP INPUT AND OUTPUT FILES

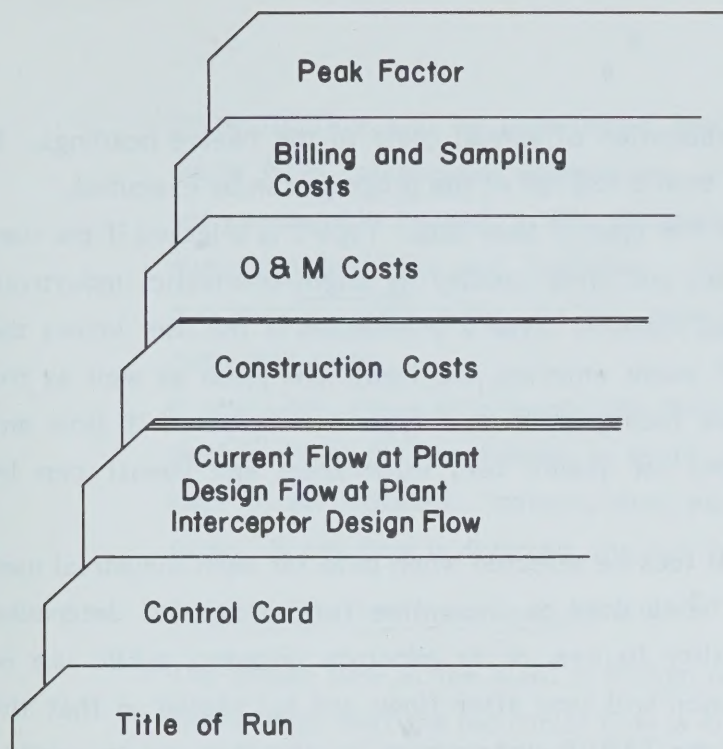


FIGURE 2 CONTENTS OF FIRST PART OF FILE 1

1.2.1 File 1

- a) Part One (see Figure 2). The form in which the first cards of file 1 appear is shown below:

```

1=GRANBY- US. ACT. SEULEMENT- VOL. ET D.B.O.- FRACTIONNEMENT 2- SITE 1
2= 1 1 2 3 256 2
3= 2 3.42 3.288 3.48 .06 13.32
4= 2 4.15 .00 4.23 .08 15.27 3.288
5= 2 9.17 0 9.32 .15 27.7704 5.5896
6= 0 .31 .26 0 0 .43
7= .23 .46 0 0 .31
8= .0 61000. 242000.
9= .0 130000. 678000. .0
10= 2000. 5000.
11= 1.7

```

Card 1 Title of run (WH)

Card 2 Control card (LPGM, LQC, LPO, L2, L3, LIP, LYN)

LGPM controls the execution of TAREP. On a first pass, it is to the user's advantage to execute only the first part of the program in order to be certain that the options selected do indeed meet the user's needs. Execution of the

first part will give the allocation of annual costs to the twelve headings. If the result is satisfactory, then a full run of the program can be executed.

LOC controls selection of the type of flow data. Type 1 is selected if the user is able to give mean flows and their quality by origin (domestic, industrial, public use, infiltration and runoff). Type 2 is selected if the user knows the mean flow and quality of water entering the treatment plant as well as the flow and quality for each industrial firm. Type 3 is selected if flow and quality for each firm and for public use, infiltration and runoff can be provided.

Type 2 or 3 flow data will thus be selected when data for each industrial user is known and TAREP is being used to determine total flows, to determine weighted-mean water-quality figures, or to generate unknown public use or infiltration flows. Execution will stop after flows are calculated so that the user may decide whether the TAREP system gives results that are acceptable and compatible with other flow data. Data obtained in this way can then be used to provide type 1 flows, and a complete execution of the program can be run.

LPO enables the user to allocate sewer system operation and maintenance costs in full or in part to users (TAREP normally allocates them to property).

While TAREP is designed to permit the division of costs between current and future users, LYN enables the user to allocate all costs attributable to future use to current domestic users. This will be useful if future users are not considered beneficiaries of the facilities and if it is not desired to have industrial users contribute to the cost of excess capacity. LYN cannot be used to divide future capacity costs between current domestic and industrial users. To accomplish this, TAREP is run with current flows set equal to design flows.

Card 3 Plant current flow (mean annual) (QAU)

The current flow at the plant is the interceptor flow minus any flow diverted at the plant entrance. The difference will mainly affect the runoff figure.

The flow is broken down as follows:

- QAU(1): domestic
- QAU(2): industrial
- QAU(3): infiltration
- QAU(4): public use
- QAU(5): runoff

Domestic flow can be determined from population figures and must include waste from commercial enterprises. Industrial flow includes all wastewater not comparable in quality with domestic waste. Public use flow is that from municipal buildings and facilities. Runoff flow can be determined from precipitation data, given the land area in the municipality that is served by a combined sewer.

If available, these data constitute flows of type 1. Otherwise TAREP can be used to make the breakdown, in which case current flows at the plant do not have to be provided. Instead, they will be taken as equal to the interceptor flows. If any flow is diverted, the user must make the correction.

Card 4 Plant design flow (mean annual) (QFU)

The design flow at the plant is broken down in the same manner as the current flow except that the industrial flow is divided into:

- the reserved future flow, which is the increased capacity requirement projected by industrial users; it must be equal to or greater than the current industrial flow at the plant;
- the unreserved future flow, which is any increased capacity requirement projected by the municipality.

All the other flows must be equal to or greater than the current flow at the plant. If TAREP has been used to obtain the current flow breakdown, the user provides only an approximation of the first five design flows and then examines the results (with LQC type 2 or 3) before proceeding to execute a complete run.

Card 5 Interceptor design flow (QFE)

The interceptor design flow is broken down into the six categories used for the design flow at the plant. With the exception of the runoff flow, these must all be equal to or greater than the interceptor current flow multiplied by the peak factor. The data for reserved industrial flow must not be rounded off because this will increase the reserved future use and may cause an error in the final result.

If TAREP has been used to obtain the current flow breakdown, the user provides only an approximation of the first five design flows and then

examines the results (with LQC type 2 or 3) before proceeding to execute a complete run.

Card 6 Breakdown of plant construction cost (PVBU)

The plant construction cost is broken down in terms of six design factors:

- volume (interceptor),
- volume (plant),
- biochemical oxygen demand (BOD),
- other,
- suspended solids (SS),
- miscellaneous.

The six figures required here are fractions whose sum is unity. The miscellaneous item represents all construction costs not attributable to any of the preceding five factors. The first two items are distinct; certain aspects of the plant are designed on the basis of the interceptor design flow (for example the pumping station), which is generally greater than the plant design flow. Making this distinction leads to a different division of costs between property and users than would otherwise result.

The format reproduced in Appendix 3 may be used to make the cost breakdown.

Card 7 Breakdown of plant operation and maintenance costs (PVOU)

The plant operation and maintenance cost is broken down into five factors:

- volume,
- BOD,
- other,
- SS,
- miscellaneous.

The five figures required here are fractions whose sum is unity. The miscellaneous item represents all operation and maintenance costs not attributable to any of the preceding four factors. No distinction is required between volume (interceptor) and volume (plant), since operation and maintenance costs depend mainly on the volume of water treated.

The format reproduced in Appendix 3 may be used to make the cost breakdown.

Card 8 Annual capital costs (VAE, VAI, VAU)

Three capital cost items are distinguished:

- the sewer system cost,
- the interceptor cost,
- the plant cost.

It is easy to distinguish the plant capital cost from the others. To distinguish the interceptor from the sewer system, the interceptor may be defined as that sewer to which only collecting sewers are connected.

If the capital cost of the sewer system is to be included, it must be applied only to ratepayers with connections to the portion of the system in question. It would not be equitable to charge all ratepayers for an extension to the system.

The cost of the pumping stations may be included either in the interceptor cost or the plant (volume/interceptor) cost. The selection of one of these options rather than the other will produce a different allocation of the "miscellaneous" plant capital cost because this cost is allocated on the basis of a weighted average of the costs assigned to the other plant factors.

Card 9 Annual operation and maintenance costs (VOE, VOI, VTOU)

Three operation and maintenance cost items are distinguished:

- the sewer system cost,
- the interceptor cost,
- the plant cost.

The operation and maintenance cost should include the cost of replacing equipment whose life is shorter than the period over which the plant cost is being amortized.

Improvement costs (VZ)

These are the costs of minor extensions and improvements that the municipality wishes to finance out of annual revenues.

Card 10 Billing and sampling costs (Y)

Card 11 Portion of sewer system operating costs allocated to property (PVOEY)

All sewer system operating costs are allocated to property unless otherwise specified.

Card 12 Peak factor (POINTE)

Most flows are input in the form of annual means. The peak factor makes it possible to compare the interceptor design flows with the mean flows on a common basis. The interceptor capacity actually used may be determined by multiplying the mean flow by the peak factor.

- b) Part two (see Figure 3). To complete file 1, a set of cards must be selected corresponding to the type of flow of a value assigned for LQZ on card 2.

Type 1 flows (see card set 1). Here is an example of the form in which the seven cards of this set appear:

1=	2	3.42	3.288	3.48	.06	20.592
2=	200	0	245			
3=	488	0	205			
4=	0	0	0			
5=	200	0	245			
6=	0	0	0			
7=	488	0	205			

Card 1 Interceptor current flow (mean annual) (QAI)

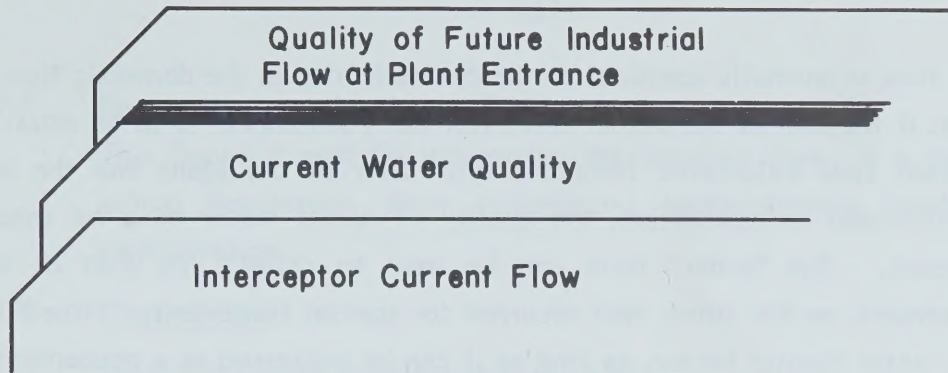
This is the flow before any wastewater is diverted at the plant entrance. It is expressed in terms of the same five categories that are used for the current flow at the plant.

Cards 2 to 6 Current water quality (C)

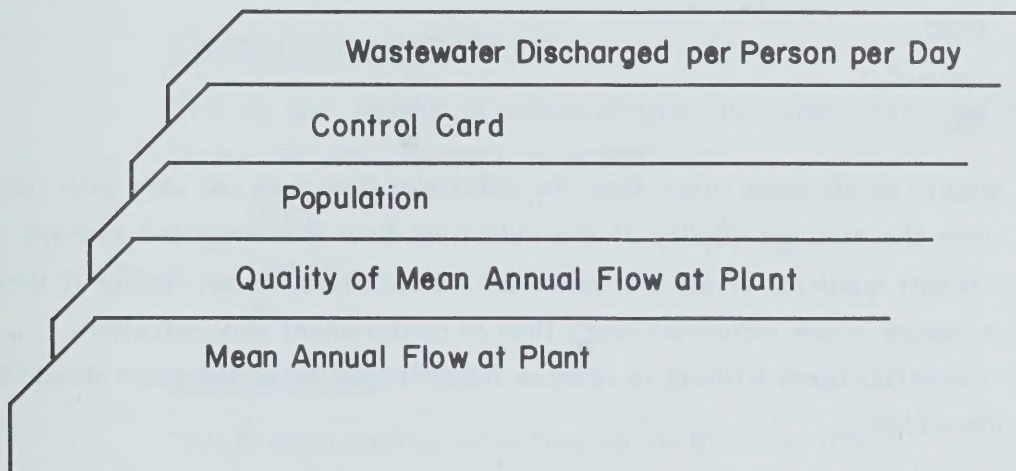
Quality factors considered are:

- biological oxygen demand (BOD),
- an "other" parameter,
- suspended solids (SS).

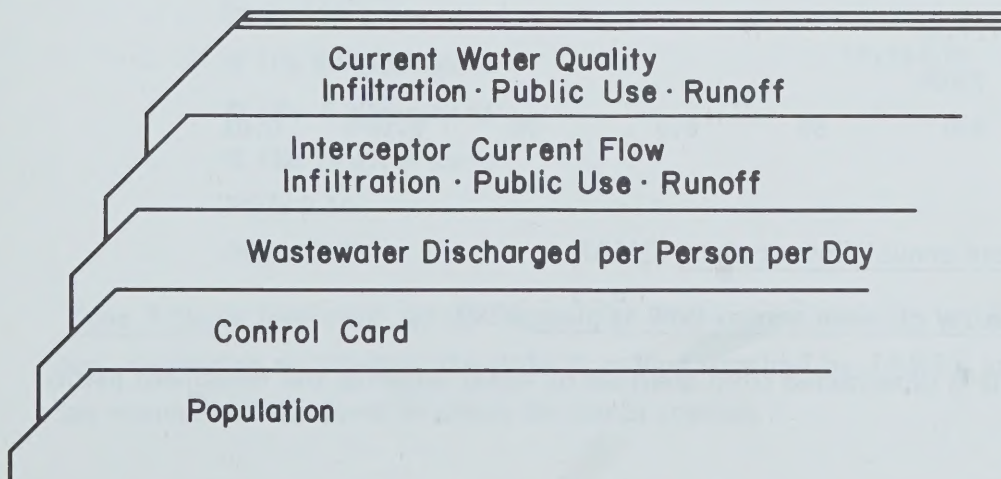
The quality of the industrial flow is a weighted average to the quality of the flow from each industrial user. The contaminant concentration in the public



Card Set 1



Card Set 2



Card Set 3

use flow is normally identical to the concentration in the domestic flow. Note that, if the sum of the actual flows (for each substance) is to be equal to the current flow calculated from the total flow at the plant and the average contaminant concentration, the quality of runoff water must be taken into account. The "other" item can be used to reflect the cost of tertiary treatment, or any other cost incurred for special treatment. "Other" can be any water quality factor, as long as it can be expressed as a concentration (in mg/L).

Card 7 Quality of future industrial flow at plant entrance (CFR)

Quality factors considered are:

- BOD,
- "other",
- SS.

The quality of all flows other than the industrial flow does not vary with time. But since the average quality of the industrial flow is a weighted average of the effluent qualities of all the industrial wastewaters, it can change if there is any change in one industrial user's flow or contaminant concentration.

Only industrial users wishing to reserve future capacity at the plant should be considered here.

Type 2 flows (see card set 2, Figure 3). There are either four or five cards in this set, depending on whether default values supplied by TAREP are used. Here is an example of the form in which the cards appear:

1=	1	116729.40					
2=	97.61	90.064.77					
3=		35000					
4=	2						
5=		400	80	0.0	90	0.10	0.03

Card 1 Mean annual flow at plant (QMA)

Card 2 Quality of mean annual flow at plant (CM)

This is determined from analyses of water entering the treatment plant.

Card 3 Population served by plant (POP)

This figure is used for generating the domestic flow. It is not necessarily the actual population, since commercial establishments must be taken into consideration.

Card 4 Control card

This card is used to select default values.

Card 5 Wastewater discharged per person per day (COM)

This data is used to estimate the domestic flow; it should be based on water consumption.

Contaminant weight (W)

This is the weight of contaminants discharged into the sewer system per person per day. Factors considered are:

- BOD,
- "other",
- SS.

Infiltration flow (PQ3)

This is estimated as some fraction of the total flow.

Public use flow (PQ4)

This is estimated as some fraction of the total flow.

If card 5 is not read, the following default values are used:

- POP: 400 L/person•d
- W (1): 80 g/person•d
- W (2): 0 g/person•d
- W (3): 90 g/person•d
- PQ3: 0.10
- PQ4: 0.03

Type 3 flows (see card set 3, Figure 3). There are either six or seven cards in this set, depending on whether the default values supplied by TAREP are used. Here is an example of the form in which the cards appear:

1=		35000				
2=	2					
3=		400	80	0.0		90
4=	2	3.48	.06	20.592		
5=		0	0			
6=	200	0	245			
7=	0	0	0			

Card 1 Population served by plant (POP)

This is not the actual population but rather an estimate that takes commercial enterprises into account.

Card 2 Control card

Card 3 Wastewater discharged per person per day (COM, W)

This is the flow and contaminant weight discharged per person per day. The following default values are used if Card 3 is not read:

COM = 400 L/person•d

W(1) = 80 g/person•d

W(2) = 0 g/person•d

W(3) = 90 g/person•d

Card 4 Interceptor current flow (QR)

Current interceptor flows must be provided for infiltration, public use and runoff.

Cards 5 to 7 Current water quality (C)

Quality data for infiltration, public use and runoff flows must be provided.

1.2.2 **File 2** (Figure 4). File 2 contains industrial ratepayer profiles, including the current and expected future characteristics of industrial wastewater. Here is an example of the form in which the cards appear:

1=	0.0816	30.0	0.1	35.0	2 1	573900.	0.0	1INDUS	1
2=	0.1267	30.0	0.1	35.0	2		0.0		

Card 1 Profile for current industrial waste (Q2, C2, MEI, NH, FI, SI, IFR, NORO)

Q2 is the mean annual flow divided by the number of operating days. The flow used here must be the one used for plant design flow.

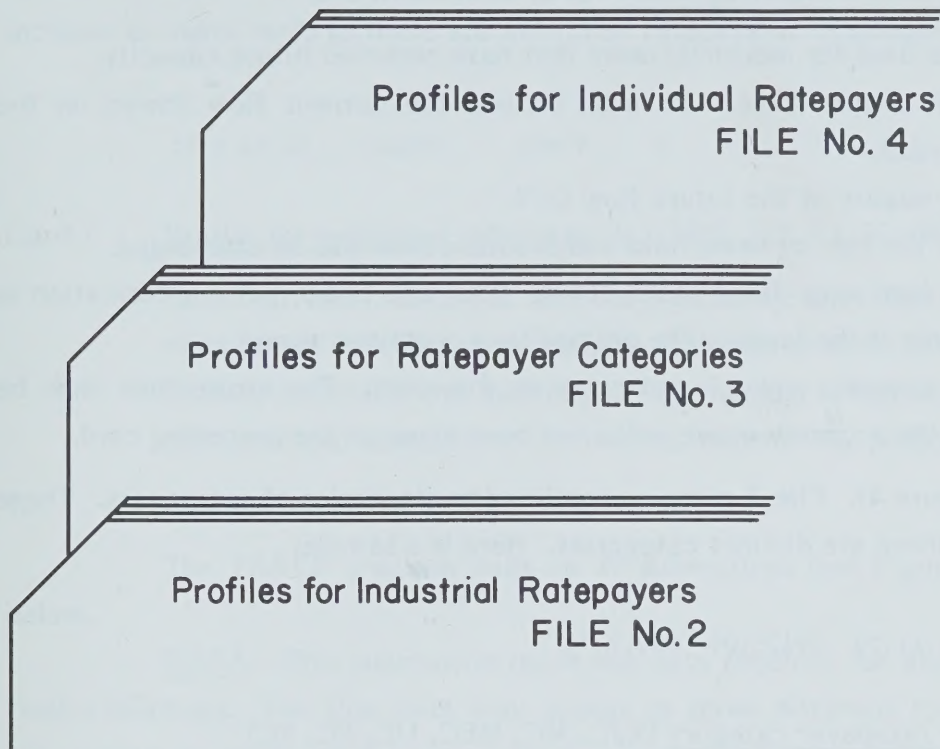


FIGURE 4 **CONTENTS OF FILES 2, 3, AND 4**

C2 is the weighted average contaminant concentration in Q2.

NH can be the number of inspection visits, the number of samples, etc., so long as the unit used permits proportional distribution of sampling costs among the industrial users incurring these costs.

The land area SI must be provided only if the industrial user is served by a combined sewer. It may be a good idea to multiply the area of the property by a runoff coefficient so that large property owners whose land only partly drains into a combined sewer are not penalized (allows for soil permeability and the presence of ditches).

IFR is a control variable to indicate whether or not an industrial user has reserved future capacity.

Q2, C2 and NH may be empty if the user in question is not yet discharging waste but wants to reserve future capacity.

The variable NORO identifies the industrial user. The number assigned to the industrial user on the municipal assessment role may be used for this purpose.

Card 2 Profile for future industrial waste (QF2, CF2, MER, SR)

This card is used for industrial users that have reserved future capacity.

QF2 is the future flow. It must include the current flow shown on the preceding card.

CF2 is the quality of the future flow QF2.

MER gives the type of sewer into which future flow will be discharged.

SR is the land area from which future flow will come. This information is provided only if the land will be drained by a combined sewer.

Note that property value is not given on this card. The future flow must be flow from the property whose value has been given on the preceding card.

1.2.3 **File 3** (Figure 4). File 3 contains profiles for categories of ratepayers. There are as many cards as there are distinct categories. Here is a sample:

1= 957.0 1 11.78 29625.29 93219.70

Card 1 Profile for ratepayer category (XJC, MC, MEC, UC, FC, SC)

Each category includes the XJC ratepayers whose characteristics are similar and who will receive the same bill. The characteristics read by the program are:

- type of ratepayer, user or non-user,
- type of sewer, combined or sanitary,
- number of "dwelling units" of waste,
- property valuation,
- land area (in the case of a ratepayer served by a combined sewer).

The number of "residential units" UC is the number of single-family dwellings in the case of domestic ratepayers. An equivalent unit is used in the case of commercial establishments not having water meters. Waste from such establishments is evaluated as a multiple of the average waste discharged by a single-family residence. This may be done on the basis of the water tax, as follows:

$$\text{number of residential units in commercial establishment} = \frac{\text{establishment's water tax}}{\text{water tax for one domestic residential unit}}$$

1.2.4 File 4 (Figure 4). File 4 contains profiles for individual ratepayers and includes as many cards as there are individual ratepayers. A sample card would be:

1= 1 10.33 53600. 49999. A

Card 1 Profile for individual ratepayer (MJ, MEJ, UJ, FJ, SJ, NOROJ)

Each individual ratepayer receives a different bill (otherwise, a file 3 category must be set up). The data read are the same as those in file 3.

NOROJ identifies the individual. The number assigned to each individual on the municipal assessment role may be used for this purpose.

1.3 Description of the TAREP Subroutines

The TAREP program calls up 20 subroutines (see Figure 5), briefly described below.

DATA. This subroutine reads the data required for allocation of costs to the twelve headings. The flow data may appear in three different forms, depending on the information available to the user. On this basis, DATA can deduce and generate certain other data.

If the user can provide quality and quantity data by origin (domestic, industrial, infiltration, public use, runoff), this will constitute type 1 flow data.

If the user knows the mean flow and quality of the water entering the plant, as well as the flow and quality of the effluents from each industrial firm, this will constitute type 2 flow data and DATA will provide flows and quality for infiltration, public use and runoff.

If the user knows the flow and quality for each firm and for infiltration, public use and runoff, this will constitute type 3 data and DATA will calculate the weighted mean flows and qualities as required by TAREP.

LECTI. This subroutine reads the industry profiles and the total values for the characteristics required for calculating unit costs, these characteristics being: number of users, number of non-users, total area drained by a combined sewer, total property values of users and non-users. The totals will not necessarily correspond to the municipality's official figures because they are obtained by adding the ratepayer characteristics that have been provided by the TAREP user; ratepayers who receive no benefit from treatment facilities will have been omitted.

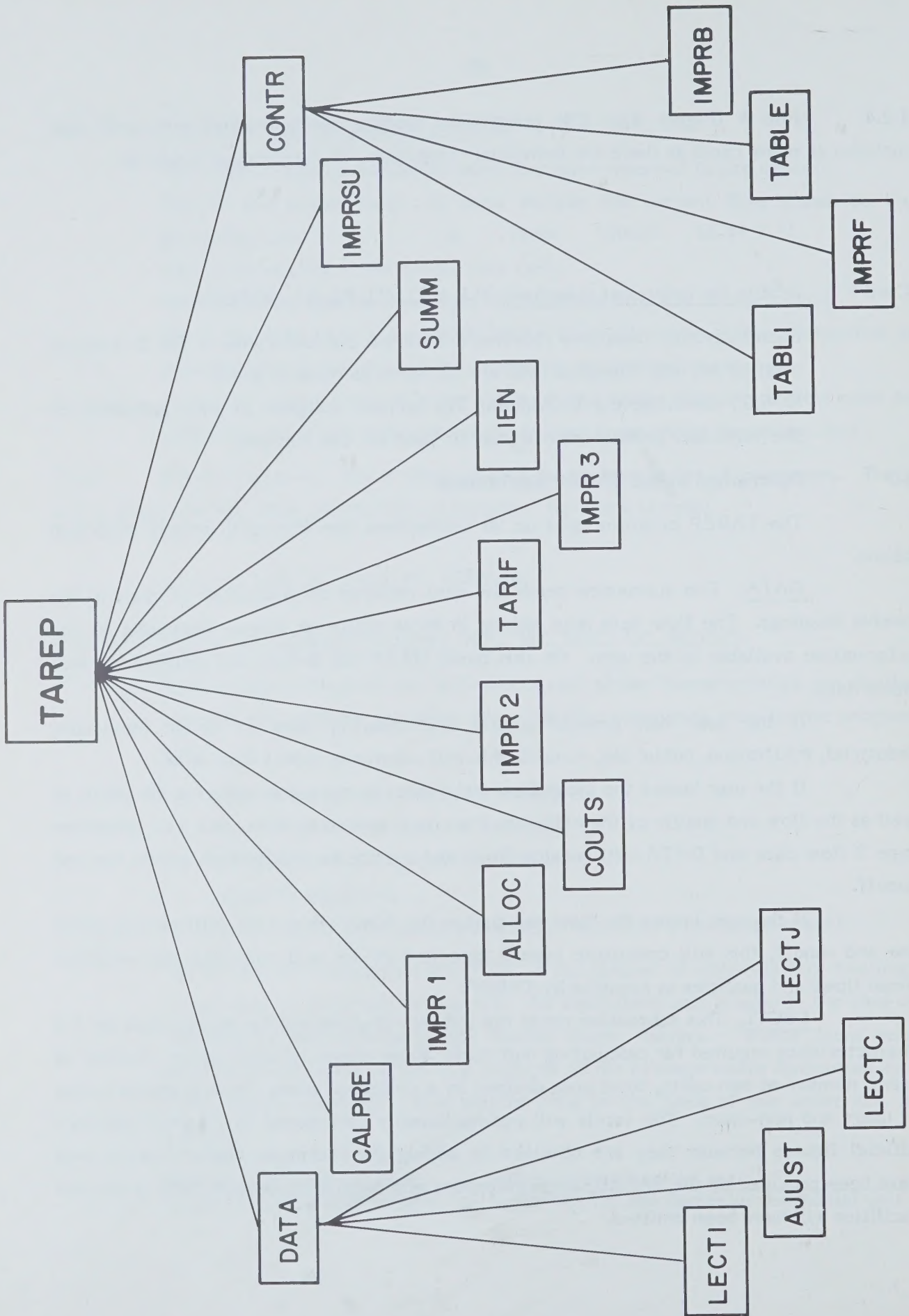


FIGURE 5 TAREP SUBROUTINES

When flow data are of type 2 or 3 (see description of DATA above), LECTI also calculates current and future industrial flows and qualities.

AJUST. This subroutine is called by DATA when the flows are of type 2. Given the quality for industrial wastewater, AJUST changes the quality figures for domestic wastewater or runoff to include all remaining contaminants.

LECTC. This subroutine reads the profiles for ratepayers assigned to categories and it continues with the summing, begun in LECTI, of the characteristics needed to calculate unit costs.

LECTJ. This subroutine reads profiles for individual ratepayers and completes the summing begun in LECTI.

CALPRE. In this subroutine, data that have been read are verified and processed for printout.

IMPRI. This subroutine prints out data read or generated by the program (see Appendix 4).

ALLOC. This is the central subroutine of TAREP, where the percentage of each cost to be allocated to the various headings is determined. No actual cost data are involved in this calculation. The percentages are determined on the basis described in Volume 1 of this study (section 2.3). All treatment plant costs are dealt with here except the miscellaneous capital cost and miscellaneous operation and maintenance cost; the latter are dealt with in the subroutine COUTS.

COUTS. Here the miscellaneous capital and O&M costs of the plant are allocated to headings on the basis of a weighted average of the percent allocations for the other plant costs.

IMPR2. This subroutine prints out the results of ALLOC and COUTS in the form of a table entitled "percent allocation of costs to users, property and reserved future use" (see Appendix 4).

TARIF. This subroutine calculates the costs to be covered under each heading by multiplying the total costs (as read) by the percentages determined in ALLOC and COUTS. TARIF also adds up these costs and does the processing necessary for printout. Note that the improvement costs are allocated in the same manner as the capital costs. Where the capital costs are nil, the improvement costs are calculated in the same manner as the O&M costs.

IMPR3. This subroutine prints out the results of TARIF in the form of a table entitled "Allocation of annual costs to heads".

LIEN. Here certain data from the first part of TAREP are transferred to the second part, where the bills are calculated.

SUMM. From the totals calculated in LECTI, LECTC and LECTJ, together with the costs allocated to the various headings, SUMM calculates the unit costs. With the exception of the charge for billing, these unit costs apply only to some ratepayers, depending on whether they are users or non-users, domestic or industrial, and served by a combined or by a sanitary sewer.

There are two rates charged per \$1000 property value and per 100 m² of land area served by a combined sewer, depending on whether the ratepayer is a user or non-user. The cost of capacity currently in use is shared among users, while non-users pay the cost of excess capacity.

If it is desired not to charge future users and to allocate all future use costs to current domestic users, the calculation is made in SUMM; in this case, the unit costs related to property (land area and valuations) are different for domestic and for industrial users.

IMPRSU. Here the results of SUMM are printed out under the heading "number of ratepayers by type", "basis of charges to property" and "unit costs" (see Appendix 4).

CONTR. This subroutine reads the profile of each ratepayer or ratepayer category, and calculates the corresponding bill on the basis of the profile and the appropriate unit costs.

TABLI. TABLI is called by CONTR and prints out the bills to industry (see Appendix 4).

IMPRF. IMPRF is called by CONTR and print outs the bills to ratepayer categories (see Appendix 4).

TABLE. TABLE is called by CONTR and prints out the bills to individual ratepayers.

IMPRB. IMPRB adds up both the bills and the costs by head and prints out the result. This verifies that revenues equal expenditures (see Appendix 4).

1.4 **Adaptation to the IBM 360**

To adapt TAREP to the IBM 360, the following changes and additions are necessary:

A. For files 5, 6, 7, 8 and 9:

- Size of records: 132 characters plus one control character

- Number of records:
 - file 5 $\approx$ number in File 1 + 60 + NC (approximately)
 - file 6 $\approx$ about 500 for TAREP; about 100 for SENSIB
 - file 7 $\approx$ about 10 per page + 12 per industrial user
 - file 8 $\approx$ about 1 per page + 11 per ratepayer category
 - file 9 $\approx$ about 7 per page + 2 per individual ratepayer

B. For SENSIB working file 10

- binary type file
- size of records: size of real variable $\times 8$
- number of records: $(NI + NC) \times NESSAI$

C. The instruction EOF must be replaced with an equivalent instruction indicating end of file.

D. The instruction ENCODE, DECODE must be replaced by equivalent instructions.

E. The degree of precision of variables and constants must be specified. Attention must also be given to the order of variables (double precision, half-words).

2 THE SENSIB PROGRAM

With the SENSIB program, TAREP users can evaluate the sensitivity of bills to changes in the treatment plant cost breakdown.

The user may supply up to ten different capital and O&M breakdowns. SENSIB calculates all the bills for each breakdown, and then selects the twelve (ten industrial and two "category") ratepayers whose bills vary most from breakdown to breakdown. For each of these twelve, SENSIB calculates the average bill, $\bar{X}$, the standard deviation, and a rating, Z :

$$Z = \frac{\text{bill} - \bar{X}}{\text{standard deviation}}$$

Finally, SENSIB selects and recommends that breakdown for which the sum of the ratings, Z , is lowest.

SENSIB uses the following FORTRAN routines also used in TAREP. DATA, CALPRE, ALLOC, COUTS, TARIF, LIEN, SUMM, LECTI, LECTC, LECTJ, AJUST (see Figure 6).

2.1 The files

SENSIB uses six files (see Figure 7). Some of these are the same as TAREP files. The data and their formats are described in Appendix 2.

2.1.1 Input Files. File 1 contains data of a general nature; file 2 contains data on industry; file 3 contains data on ratepayer categories, and file 4 contains data on individuals.

2.1.2 Output files. File 5 contains a transcription of the data read. File 6 contains the results:

- bills for the ten industrial and two "category" ratepayers with the greatest percent variations;
- the sum of Z ratings for each breakdown;
- the recommended breakdown.

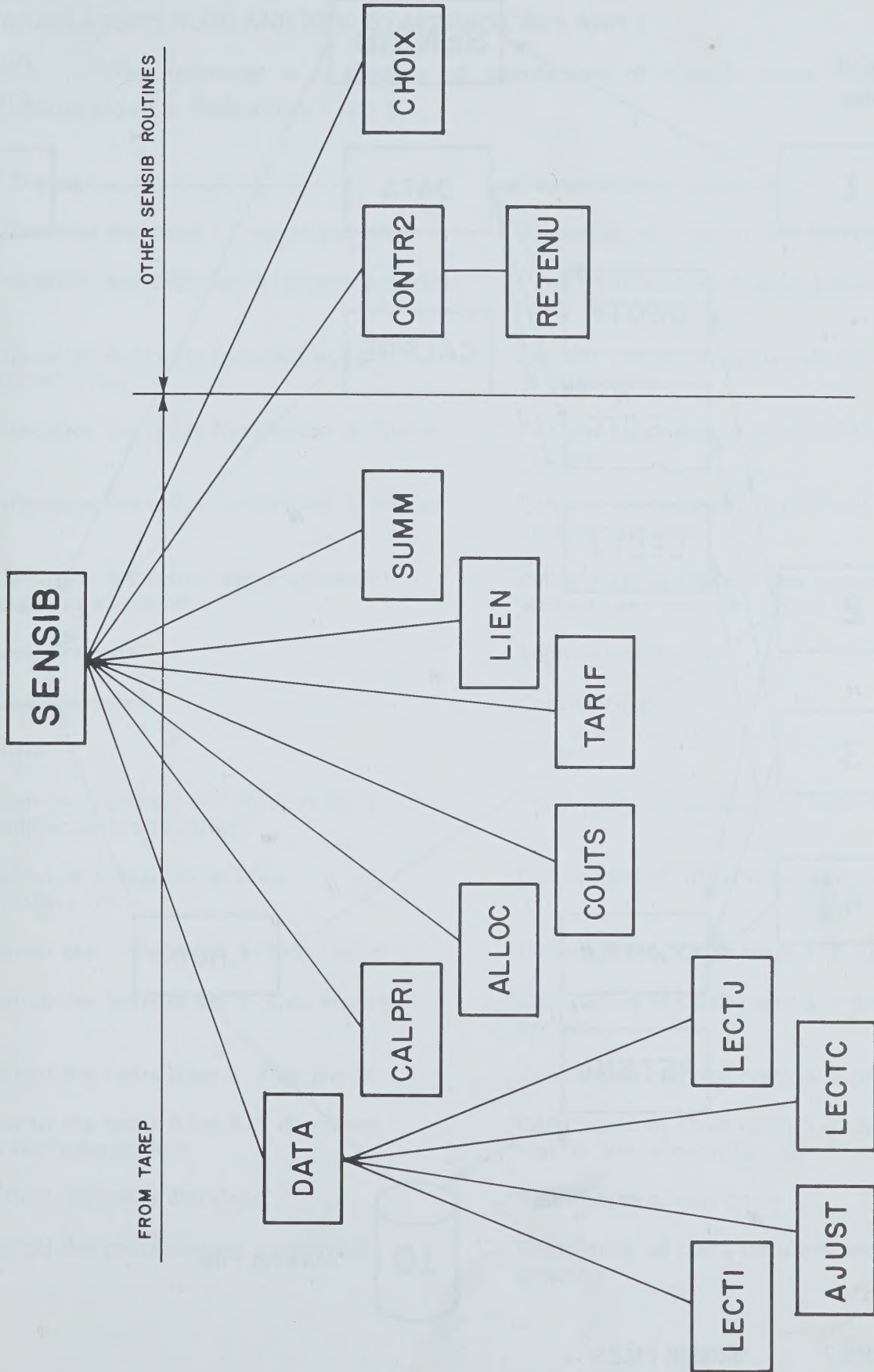


FIGURE 6 SENSIB SUBROUTINES

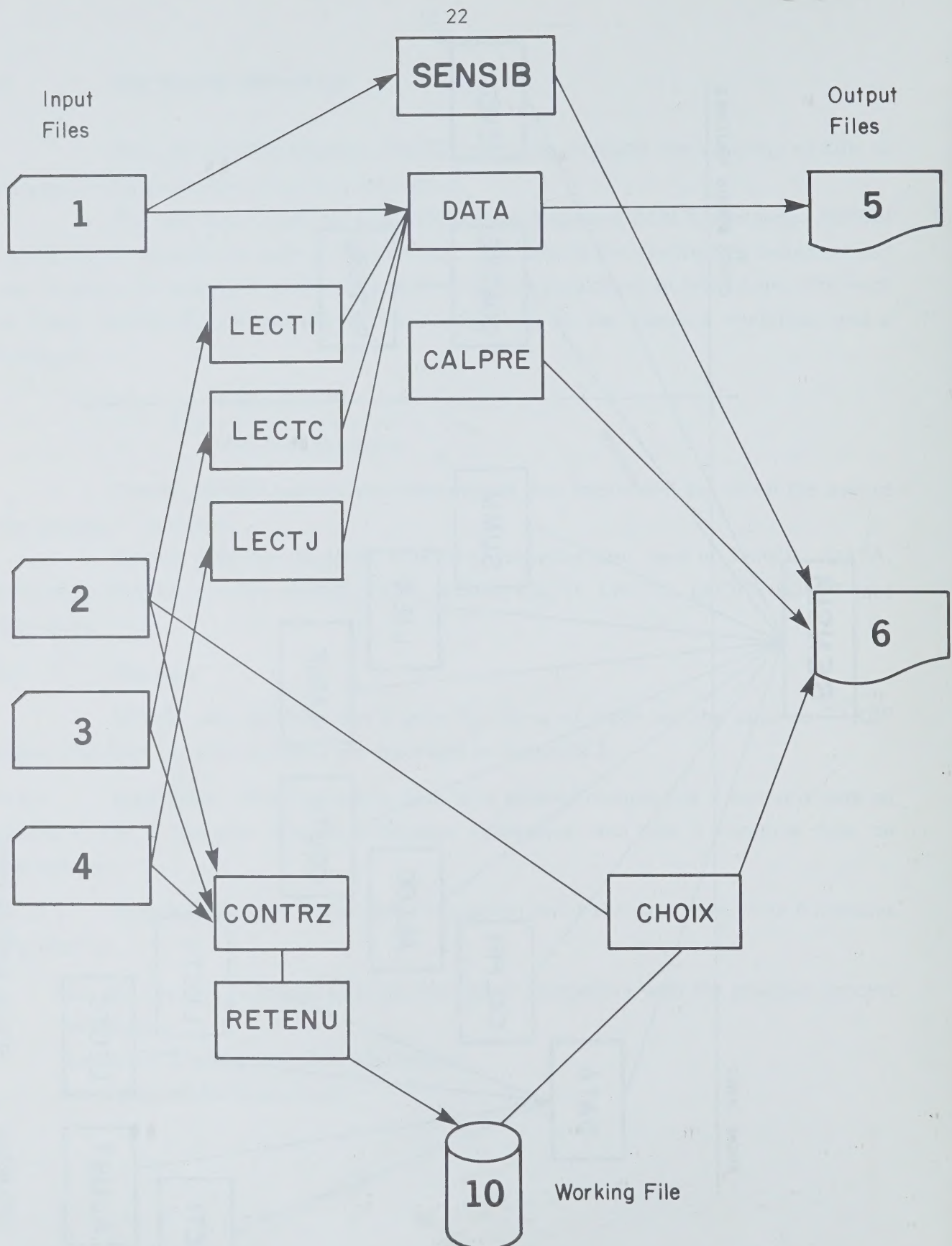


FIGURE 7

SENSIB FILES

TRANSLATOR'S NOTE AND KEY TO APPENDICES 4 AND 5

The following is a glossary of translations of French terms used in the printouts shown in Appendices 4 and 5.

À l'usine	At the plant
Allocation des coûts à l'utilisateur par poste	Allocation of costs to user by heading
Allocation des coûts entre usagers-propriété	Percent allocation of costs between users and property
Allocation des coûts fixes/entop de l'intercepteur	Percent allocation of fixed/O&M costs of interceptor
Allocation des coûts fixes/entop de l'usine	Percent allocation of fixed/O&M costs of plant
Allocation des coûts fixes/entop du réseau	Percent allocation of fixed/O&M costs of sewer system
Allocation des coûts usager - propriété - usage futur réservé	Percent allocation of costs to users, property and reserved future use
Améliorations	Improvements
Amortissement	Capital cost
Autre	Other
Bilan des dépenses par poste et de la sommation des factures	Total costs by heading and total bills
Calcul de la qualité de l'eau d'infiltration	Calculation of infiltration water quality
Calcul des coûts entop X-Y de l'usine	Calculation of O&M costs X-Y for plant
Calcul des coûts entop X-Y du réseau	Calculation of O&M costs X-Y for sewer system
Calcul des coûts fixes X-Y de l'usine	Calculation of fixed costs X-Y of plant
Calcul des coûts fixes X-Y du réseau et de l'intercepteur	Calculation of fixed costs X-Y for sewer system and interceptor
Calcul des coûts unitaires	Calculation of unit costs
Calcul des coûts usagers - propriété	Calculation of costs for users and property

Calcul des factures

Calcul des taux d'allocation globaux

Calcul du débit domestique

Calculs préliminaires

Ce programme utilise TAREP en sous-routine pour montrer un échantillon des résultats (factures) en fonction des fractions choisies pour le partage des coûts

Choix des catégories et industries intéressantes

Choix et écriture de la plus petite somme

Commercial

Contribuables

Coût d'échantillonnage unitaire

Coût de chaque facture

Coût de construction de l'usine

Coût de facturation unitaire

Coût par unité d'évaluation foncière

Coût par unité de logement

Coût par unité de superficie de ruissellement

Coûts

Coûts par unité de concentration industrielle future réservée

Coûts par unité de volume industriel futur réservé

Critères de facturation

Dans l'intercepteur

DBO

Débit

Calculation of invoices

Calculation of total overall allocation

Calculation of domestic flow

Preliminary calculations

This program uses TAREP as a subroutine to give a sample of results (bills) for selected cost breakdowns

Selection of categories and industries with greatest variations

Selection of smallest sum

Commercial

Ratepayers

Cost per sampling

Cost of each bill

Plant construction cost

Cost per invoice

Cost per unit of property evaluation

Cost per residential unit

Cost per unit of land area drained

Costs

Costs per unit of contaminant concentration industrial future reserved

Costs per unit volume industrial future reserved

Basis of charges

In the interceptor

BOD

Flow

Débit de ruissellement	Runoff flow
Débit d'infiltration	Infiltration flow
Débit d'usage public	Public use flow
Débit lu en m^3/j ; aucune transformation	Flow read in m^3/d ; no conversion
Débits actuels	Current flows
De l'intercepteur	For the interceptor
De l'usine	For the plant
Dépenses annuelles	Annual costs
Desservis par un réseau domestique	Served by a sanitary sewer
Desservis par un réseau unitaire	Served by a combined sewer
Distribution des dépenses annuelles	Distribution of annual costs
Divers	Miscellaneous
Domestique	Domestic
Données lues ou générées par le programme	Data read or generated by the program
Eaux usées	Wastewater
Échantillonnage	Sampling
Échantillon des factures les plus sensibles	Sample of bills most sensitive (to changes in cost breakdown)
Entop	O&M
Entretien	Maintenance
Évaluation foncière	Property assessment
Facteur de majoration du débit moyen	Peak factor
Facture	Invoice
Grand	Large
Global d'amortissement	Overall capital
Global usine	Overall plant
Hypothèse sur le rejet	Assumed discharge

Impression de la cartouche	Printout of bills to individual ratepayers
Impression des débits	Printout of flows
Impression des factures des contribuables par catégorie	Printout of ratepayers' bills by category
Impression des résultats	Printout of results
Impression du tableau des factures industrielles	Printout of table showing bills to industry
Industriel futur réservé	Reserved future industrial
Infiltration	Infiltration
Initialization	Reset
Initialization provenant de SUMM	Reset for SUMM
Intercepteur	Interceptor
Lecture de l'allocation des frais ent-op	Reading of O&M cost allocation
Lecture des caractéristiques du débit domestique	Reading of domestic flow characteristics
Lecture des concentrations	Reading of contaminant concentrations
Lecture des coûts d'amortissement annuels	Reading of annual capital costs
Lecture des coûts de facturation et d'échantillonnage	Reading of invoicing and sampling costs
Lecture des coûts d'opération	Reading of operating costs
Lecture des débits	Reading of flows
Lecture des débits et de qualité de l'eau d'infiltration, d'usage public et de ruissellement	Reading of flows and quality of infiltration, public use and runoff water
Lecture des données	Reading of data
Lecture des profils des catégories de contribuables	Reading of ratepayer category profiles
Lecture des profils des contribuables individuels	Reading of individual ratepayer profiles

Lecture des profils des industries	Reading of industry profiles
Lecture des variables dummy	Reading of dummy variables
Lecture du débit à l'usine	Reading of flows to the plant
Lecture du fractionnement des coûts de construction et des coûts ent-op de l'usine	Reading of plant construction and O&M costs
Lecture du titre	Reading of title
Les débits de conception de l'intercepteur ne peuvent être plus faibles que pointe x les débits actuels	The interceptor design flows cannot be less than peak x current flows
Le débit de conception...est plus faible que le débit actuel...corriger	The design flow is less than the current flow...correct
Le débit réservé industriel de conception de l'intercepteur doit être plus grand que la pointe x le débit industriel actuel	The reserved industrial design flow of the interceptor must be greater than the peak x the current industrial flow
Le débit réservé industriel de conception de l'usine doit être plus grand que le débit industriel actuel	The reserved industrial design flow at the plant must be greater than the current industrial flow
Le débit total est plus faible que la somme des débits domestique et industriel; vérifier les données	The total flow is less than the sum of the domestic and industrial flows; check data
Les dépenses attribuables aux non-usagers ont été reportées aux usagers domestiques actuels	Costs attributable to non-users have been allocated to current domestic users
MS	SS
Nombre de personnes	Number of people
Non-usagers	Non-users
Nous vous suggérons votre essai no. -	We suggest use of trial no. -
Partage des tarifs d'épuration entre propriété-usagers et usage futur réservé	Division of treatment charges between property-users and reserved future use
Petit	Small
Poste	Heading
Préparation pour les fonctions UNIT et UNIT2	Preparation for functions UNIT and UNIT2

Profil des contribuables	Ratepayers profile
Propriété	Property
Qualité de l'eau	Water quality
Qualité du débit industriel de conception de l'usine	Quality of industrial design flow of the plant
Quantité	Quantity
Relie l'information calculée dans la partie du programme partageant les tarifs à celle émettant les factures par le biais de changements de variables	Relays information calculated in the part of the program that distributes charges to that part that produces bills, through changes in variables
Répartition des coûts d'améliorations	Breakdown of improvement costs
Répartition des coûts de construction et d'entop	Breakdown of plant construction and O&M costs
Répartition des coûts divers	Breakdown of miscellaneous costs
Reprise des factures intéressantes	Bills of ratepayers selected
Réseau	Sewer system
Retour de la sub 210	Return of sub 210
Ruissellement	Runoff
Si entop	If O&M
Sommaire des dépenses annuelles	Summary of annual costs
Somme des côtes	Sum of ratings
Somme des coûts par poste	Sum of costs by heading
Sous total	Sub total
Superficie drainée	Land area drained
Surfaces lues en m ² ; aucune transformation	Surface area read in m ² ; no conversion
Tous les contribuables	All ratepayers
Transformation d'acre en m ²	Conversion of acres to m ²
Transformation de MGIMP/J en m ³ /j	Conversion of Imp. mgd to m ³ /d

Transformation of MGUS/J en m ³ /d	Conversion of U.S. mgd to m ³ /d
Transformation de PI.CA. en m ²	Conversion of ft ³ to m ²
Transformation des unités de débit	Conversion of flow units
Transformation des unités de surface	Conversion of surface area units
Type de	Type of
Unité d'échantillonnage	Sampling unit
Unités de logement	Residential units
Us. act. seulement	Current use only
Us. act. et fut. - vol., DBO et MS - fractionnement 4	Current and future use - volume, BOD and SS - breakdown 4
Usage futur réservé	Reserved future use
Usage public	Public use
Usager	User
Volume égout	Volume (sewer)
Vous demandez trop d'essai	You are requesting too many breakdowns
Vous demandez trop d'industries ou de catégories	You are requesting too many industries or categories.

APPENDIX 1

DATA FORMATS FOR TAREP INPUT FILES

FILE 1: General data

Card	Format	Column	Variable	Description
1	18A4	1-72	WH	Title of run
2	712	1-2	LPGM	Control card Dummy instruction to select desired job: = 1, all results = 2: "percent allocations of costs" and "allocation of costs to heads" only
		3-4	LQC	Dummy instructions for reading flows: = 1: flows of type 1 = 2: flows of type 2 = 3: flows of type 3 if LQC = 2 or 3: run stops after printout by IMPR1
		5-6	LPO	Dummy instructions for reading portion of sewer system operational costs allocable to property: = 1: value read = 2: default value (PVOEY = 1.0)
		7-8	L2	Units in which industrial flows will be read from TAPE2 = 1: m^3/d = 2: US mgd = 3: IMP mgd
		9-10	L3	Units in which land areas will be read from TAPE2, TAPE3 and TAPE4 = 1: m^2 = 2: ft^2 = 3: acres
		11-12	LIP	Net number of lines per page for printout of results

Card	Format	Column	Variable	Description
		13-14	LYN	= 1: costs allocated to current and future users = 2: costs allocated to current users only
3				Current flow at plant (mean annual)
	12	1-2	LU	Units in which flows on this card will be read: = 1: m ³ /d = 2: US mgd = 3: IMP mgd = 0: if QAU = QAI*
	F10.0	3-12	QAU(1)	domestic
	F10.0	13-22	QAU(2)	industrial
	F10.0	23-32	QAU(3)	infiltration
	F10.0	33-42	QAU(4)	public use
	F10.0	43-52	QAU(5)	runoff
* If the current flow at the plant (QAU) is equal to the current flow in the interceptor (QAI), that is, if there is no diversion or overflow, it is not necessary to enter the plant flow.				
4				Design flow at plant (mean annual)
	12	1-2	LU	Units in which flows on this card will be read: = 1: m ³ /d = 2: US mgd = 3: IMP mgd
	F10.0	3-12	QFU(1)	domestic
	F10.0	13-22	QFU(2)	unreserved industrial
	F10.0	23-32	QFU(3)	infiltration

Card	Format	Column	Variable	Description
	F10.0	33-42	QFU(4)	public use
	F10.0	43-52	QFU(5)	runoff
	F10.0	53-62	QFU(6)*	reserved industrial (QAU(2)<QFU(6))
* QFU (6) is not needed if LQC=2 or LQC=3, because it is calculated by summing the flows from each industrial user.				
5				Interceptor design flow (peak flow)
	I2	1-2	LU	Units in which flows on this card will be read: = 1: m ³ /d = 2: US mgd = 3: IMP mgd
	F10.0	3-12	QFE(1)	domestic
	F10.0	13-22	QFE(2)	unreserved industrial
	F10.0	23-32	QFE(3)	infiltration
	F10.0	33-42	QFE(4)	public use
	F10.0	43-52	QFE(5)	runoff
	F10.0	53-62	QFE(6)*	reserved industrial
* QFE (6) is not needed if LQC=2 or LQC=3, because it is calculated by summing the flows from each firm.				
6	6F5.0			Breakdown of plant construction cost
		1-5	PVBU(10)	Portion of construction cost attributable to interceptor flow
		6-10	PVBU(11)	Portion of construction cost attributable to plant flow
		11-15	PVBU(12)	Portion of construction cost attributable to BOD
		16-20	PVBU(13)	Portion of construction cost attributable to the "other" parameter

Card	Format	Column	Variable	Description
		21-25	PVBU(14)	Portion of construction cost attributable to SS
		26-30	PVBU(15)	Portion of construction cost not attributable to any plant design factor
7	5F5.0			Breakdown of plant O&M cost
		1-5	PVOU(11)	Portion of O&M cost attributable to plant flow
		6-10	PVOU(12)	Portion of O&M cost attributable to BOD
		11-15	PVOU(13)	Portion of O&M cost attributable to the "other" parameter
		16-20	PVOU(14)	Portion of O&M attributable to SS
		21-25	PVOU(15)	Portion of O&M cost not attributable to any plant design factor
8	3F12.0			Annual capital cost
		1-12	VAE	Annual capital cost of sewer system
		13-24	VAI	Annual capital cost of interceptor
		25-36	VAU	Annual capital cost of treatment plant
9	4F12.0			Annual O&M cost improvement cost
		1-12	VOE	Annual O&M cost of sewer system
		13-24	VOI	Annual O&M cost of interceptor
		25-36	VTOU	Annual O&M cost of treatment plant
		37-48	VZ	Improvement cost
10	2F10.0			
		1-10	Y(9)	Billing cost
		11-20	Y(10)	Sampling cost

Card	Format	Column	Variable	Description
11	if LPO = 1, read card 11 if LPO = 2, a default value is generated			
	F10.0	1-10	PVOEY	Portion of sewer system operational cost allocatable to property (if LPO = 2, PVOEY = 1.0)
12	F10.0	1-10	POINTE	Factor for calculation of peak flow from mean flow; suggested value: 2.0

To complete file 1, select the card set corresponding to the type of flow selected by the variable LQC on card 2:

LQC = 1 :	type 1 flow	card set 1
LQC = 2 :	type 2 flow	card set 2
LQC = 3 :	type 3 flow	card set 3

CARD SET 1

Card	Format	Column	Variable	Description
1				Interceptor current flow (mean annual)
	I2	1-2	LU	Units in which flows on this card will be read: = 1: m ³ /d = 2: US mgd = 3: IMP mgd
	F10.0	3-12	QAI(1)	domestic
	F10.0	13-22	QAI(2)	industrial
	F10.0	23-32	QAI(3)	infiltration
	F10.0	33-42	QAI(4)	public use
	F10.0	43-52	QAI(5)	runoff
One card for each of the five flows on card 1				
2-6				Current wastewater quality
	F6.0	1-6	C(I,12)	Biological oxygen demand (BOD) (mg/L)
	F6.0	7-12	C(I,13)	"other" (mg/L)
	F6.0	13-18	C(I,14)	Suspended solids (SS) (mg/L)
7				Quality of future industrial flow at plant entrance
	F6.0	1-6	CFR(12)	BOD (mg/L)
	F6.0	7-12	CFR(13)	"other" (mg/L)
	F6.0	13-18	CFR(14)	SS (mg/L)

CARD SET 2

Card	Format	Column	Variable	Description
1	I2	1-2	LU	Units in which flows on this card will be read = 1: m ³ /d = 2: US mgd = 3: IMP mgd
	F10.0	3-12	QMA	Mean annual flow at plant (before diversion)
2				Average wastewater quality at plant
	3F6.0	1-6	CM(1)	BOD (mg/L)
		7-12	CM(2)	"other" parameter (mg/L)
		13-18	CM(3)	SS (mg/L)
3	F12.0	1-12	POP	Domestic and commercial population served by plant
4	4I2			Control card
		1-2	LDEF	= 1: read card 5 = 2: use default values
5	Insert if LDEF = 1			
	6F10.0	1-10	COM	Wastewater discharged per person per day. Default value: 400 L/p•d
		11-20	W(1)	BOD weight discharged per person per day. Default value: 80 g/p•d
		21-30	W(2)	"other" weight discharged per person per day. Default value: 0.0 g/p•d
		31-40	W(3)	SS weight discharged per person per day. Default value: 90 g/p•d
		41-50	PQ3	Portion of total flow QMA arising from infiltration. Default value 10%
		51-60	PQ4	Portion of total flow QMA arising from public use. Default value: 3%

CARD SET 3

Card	Format	Column	Variable	Description
1	F12.0	1-12	POP	Domestic and commercial population served by plant
2	2I2			Control card
		1-2	LDEF	= 1: read card 3 = 2: use default values
3	Insert if LDEF = 1			
	4F10.0	1-10	COM	Wastewater discharged per person per day. Default value: 400 L/p•d
		11-20	W(1)	BOD weight discharged per person per day. Default value: 80 g/p•d
		21-30	W(2)	"other" weight discharged per person per day. Default value: 0.0 g/p•d
		31-40	W(3)	SS weight discharged per person per day. Default value: 90 g/p•d
4				Interceptor current flow (mean annual)
	I2	1-2	LU	Units in which flows on this card will be read = 1: m ³ /d = 2: US mgd = 3: IMP mgd
	F10.0	3-12	QR(1)	infiltration
	F10.0	13-22	QR(2)	public use
	F10.0	23-32	QR(3)	runoff
One card for each of the three flows on card 4				
5-7				Quality of current wastewater flow
	F6.0	1-6	C(I,12)	BOD (mg/L)
	F6.0	7-12	C(I,13)	"other" (mg/L)
	F6.0	13-18	C(I,14)	SS (mg/L)

FILE 2: Data on industrial ratepayers

Card	Format	Column	Variable	Description
1	Use one card for each industrial user			Profile of industrial user
	F10.0	1-10	Q2	Mean annual flow
	F6.0	11-16	C2(1)	Average BOD concentration (in mg/L) in Q2
	F6.0	17-22	C2(2)	Average "other" concentration (in mg/L) in Q2
	F6.0	23-28	C2(3)	Average SS concentration (in mg/L) in Q2
	I2.0	29-30	MEI	Type of sewer serving industry = 1: combined = 2: sanitary
	I2	31-32	NH	Number of sampling units
	F10.0	33-42	FI	Property valuation
	F10.0	43-52	SI	Land area (SI = 0.0 if MEI = 2)
	I2	53-54	IFR	= 1 if firm has reserved future flow = 0 otherwise
	1A9	55-63	NORO	Identifier for industry
2	Insert card 2 after card 1 for each industry having a reserved future flow (IFR =1)			
	F10.0	1-10	QF2	Reserved future flow
	F6.0	11-16	CF2(1)	Average BOD concentration (in mg/L) in QF2
	F6.0	17-22	CF2(2)	Average "other" concentration (in mg/L) in QF2
	F6.0	23-28	CF2(3)	Average SS concentration (in mg/L) in QF2

Card	Format	Column	Variable	Description
	I2	29-30	MER	Type of sewer that will be serving industry = 1: combined = 2: sanitary
	12X	31-42		
	F10.0	43-52	SR	Future land area (SR = 0.0 if MER = 2)

FILE 3: Data on ratepayer categories

Card	Format	Column	Variable	Description
Use one card for each category				Profile for category
F6.0		1-6	XJC(1)	Number of ratepayers in category
I2		7-8	MC(1)	Type of ratepayer = 1: user = 2: non-user
I2		9-10	MEC(1)	Type of sewer serving category = 1: combined = 2: sanitary
F4.0		11-14	UC(1)	Number of "residential units" for every ratepayer in category
F10.0		15-24	CF(1)	Property valuation for each ratepayer in category
		25-34	SC(1)	Land area for each ratepayer in category served by combined sewer (SC(I) = 0.0 if MEC (I) = 2)

FILE 4: Data on individual ratepayers

Card	Format	Column	Variable	Description
Use one card for each individual ratepayer				
				Profile for individual ratepayer
I2		1-2	MJ(1)	Type of ratepayer = 1: user = 2: non-user
I2		3-4	MEJ(1)	Type of sewer serving ratepayer = 1: combined = 2: sanitary
F4.0		5-8	UJ(1)	Number of dwelling units
F10.0		9-18	FJ(1)	Property valuation
F10.0		19-26	SJ(I)	Land area (SJ(I) = 0.0 if MEJ (I) = 2)
IA9		27-35	NOROJ	Identification for individual ratepayer

APPENDIX 2

DATA FORMATS FOR SENSIB INPUT FILES

FILE 1: General Data

Card	Format	Column	Variable	Description
1-5				Same as first five cards of TAREP file 1
6-7				Card 6 or Card 7 may be blank: percentages related to O&M or construction costs may be read but not used, being replaced by the percentages in card set X.
8-12 and card set 1, 2 or 3				Same as cards in TAREP file 1

FILE 1: General Data

Card	Format	Column	Variable	Description
1-5				Same as first five cards of TAREP file 1
6-7				Card 6 or Card 7 may be blank: percentages related to O&M or construction costs may be read but not used, being replaced by the percentages in card set X.
8-12 card set 1, 2 or 3				Same as cards in TAREP file 1
Card set X (follows set 1, 2 or 3)				
1	212			
		1-2	NESSAI	Number of breakdowns being compared (maximum 10)
		2-4	IPBO	= 1 if breakdown is for construction costs
				= 2 if breakdown is for O&M costs

Use card set 1 if IPBO = 1

Use card set 2 if IPBO = 2

CARD SET 1 - (IPBO = 1)

Card	Format	Column	Variable	Description
	5F5.0			Breakdown of plant construction costs
		1-5	FRACTS(1)	Fraction of costs attributable to interceptor flow
		6-10	FRACTS(2)	Fraction of costs attributable to plant flow
		11-15	FRACTS(3)	Fraction of costs attributable to BOD
		16-20	FRACTS(4)	Fraction of costs attributable to "other"
		21-25	FRACTS(5)	Fraction of costs attributable to SS

CARD SET 2 - (IPBO = 2)

	4F5.0			Breakdown of plant O&M costs
		1-5	FRACTS(2)	Fraction of costs attributable to plant flow
		6-10	FRACTS(3)	Fraction of costs attributable to BOD
		11-15	FRACTS(4)	Fraction of costs attributable to "other"
		16-20	FRACTS(5)	Fraction of costs attributable to SS

Files 2, 3 and 4

Same as TAREP files 2, 3 and 4

APPENDIX 3
COST BREAKDOWN FORMS

BREAKDOWN OF PLANT CONSTRUCTION COSTS

Item	Cost	Design Factors							
		Volume (interceptor)	Volume (plant)	BOD	"other	SS	Miscellaneous		
		% \$	% \$	% \$	% \$	% \$	% \$	% \$	% \$

BREAKDOWN OF PLANT O&M COSTS

Item	Cost	O&M Factors							
		Volume (interceptor)	Volume (plant)	BOD	"other	SS	Miscellaneous		
		%	%	%	%	%	%	\$	\$

APPENDIX 4
THE TAREP PROGRAM IN FORTRAN
WITH SAMPLE RUN


```

1  PROGRAM TAREP(TAPE1,TAPE2,TAPE3,TAPE4,OUTPUT,TAPE5=OUTPUT,TAPE6=OU
    +TPUT,TAPE7=OUTPUT,TAPE8=OUTPUT,TAPE9=OUTPUT)
C
C  PROGRAMME TAREP
C  PARTAGE DES TARIFS D'EPURATION ENTRE PROPRIETE-USAGERS
C  ET USAGE FUTUR RESERVE;
C  FACTURES AUX CONTRIBUABLES
C
10  LOGICAL LSTOP
    COMMON/DAT/GAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VOU(15),WH(20),
    VAE,VAI,VAU,VOE,VOI,VZ,PVOEX,VOIY,PVOUY,PPOUY,POINTE,
    FVOU(15),VTOU,GAU(5),LSTOP,LPGM,CFR(15),QF2,
    CF2(3),LOC
15  COMMON/CAL/PQFU(5),PQFE(5),PQA(5),PVB(15),
    QTAI,QTFU,QTFE,VTRU,VTO,VTA,VT,QTAU
    COMMON/ALL/WTA(15),WTF(15),PVAUX(15),PVAUY(15),
    PVAIX,PVAIX,PVOEX,PVOIX,PVOUX,
    P3M(15),P3MR(15),P3NR(15),
    P1M,P1MR,P1MC,P2M,P2NR,P2MC,P2MR,P2NC,P4M,P4MR,P4MC
20  4,P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
    COMMON/COU/VAUY(15),VAUX(15),VOUY(15),VOUX(15),
    VAEY,VAIY,VAIX,PVTAUY,PVTAUX,VOEX,VOEY,VOIY,VOIX,
    PUTOY,PVTOX,PVTAY,PVTAX,PVTX,PVTY,
    V3M(15),V3MR(15),V3NR(15),
    P3MT,P3NT,P3MR,P3MCT,P3NCT,P3NCT,V6N,V6NR,V6NC
25  5,V2XFR,V3XFR(15),PT3XFR,V5XFR,V6XFR(15),
    6PTOXFR,PTAXFR,PTXFR
    COMMON/TAR/PVXO(15),VOX(15),PVAX(15),VAX(15),PVZX(15),VZX(15),
    PVGX(15),VGX(15),
    POMRT,POMCT,PONRT,PONCT,
    VOMRT,VOMCT,VONRT,VONCT,VTOY,VTOX,
    PAMRT,PAMCT,PANRT,PANCT,
    VAMRT,VAMCT,VANRT,VANCT,VTAI,VTAX,
    PZMR,PZMC,PZNR,PZNC,PVTZY,PVTZX,
    VZMR,VZMC,VZNR,VZNC,VITZY,VITZX,
    PTMR,PTMC,PTNR,PTNC,
    VTMR,VTMC,VTNR,VTNC,VTY,VTX
30  1,VAXFR(15),VOXFR(15),POXFR(15),PAXFR(15),VTOXFR,VTAI,VTXFR
    2,PTZFR,VZFR(15),PZFR(15),VGXFR(15),PGXFR(15),VIXFR
    COMMON/DAT1/C1(3),C9(3),GA1,GA2,Y(14),C6(3)
    COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
    COMMON/CONV/CONVT(3),CONVT2(3)
35  1
    2
    3
    4
    5
    6
    7
    8
    9
40  1,VAXFR(15),VOXFR(15),POXFR(15),PAXFR(15),VTOXFR,VTAI,VTXFR
    2,PTZFR,VZFR(15),PZFR(15),VGXFR(15),PGXFR(15),VIXFR
    COMMON/DAT1/C1(3),C9(3),GA1,GA2,Y(14),C6(3)
    COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
    COMMON/CONV/CONVT(3),CONVT2(3)
45  PREPARATION POUR LES FONCTIONS UNIT ET UNIT2
    UNIT
C
C  TRANSFORMATION DES UNITES DE DEBIT
C  L1=1, DEBIT LU EN M3/J: AUCUNE TRANSFORMATION
C  L1=2, TRANSFORMATION DE MGUS/J EN M3/J
C  L1=3 TRANSFORMATION DE MGIMP/J EN M3/J
50  UNIT2:
C
C  TRANSFORMATION DES UNITES DE SURFACE
C  L3=1, SURFACES LUES EN M2: AUCUNE TRANSFORMATION
C  L3=2, TRANSFORMATION DE PI.CA. EN M2
55

```



```

1  SUBROUTINE DATA
   LOGICAL LSTOP, MEMQUI
   COMMON/DAT/QAI(5), QFU(6), QFE(6), C(5,15), VRU(15), VQU(15), WH(20),
5  VAE, VAI, VAU, VOE, VOI, VZ, FVOEY, FVOIY, FVOUY, FPOINTE,
   FVQU(15), VTOU, QAU(5), LSTOP, LFGM, CFR(15), QF2,
   CF2(3), LQC
10  COMMON/DAT1/C1(3), C9(3), QAI, QAZ, Y(14), C6(3)
   COMMON/DAT2/XJC, UC, FC, SC, UJ, FJ,
   SJ, FI, SI, Q2, C2(3), UI,
   MC, MEC, MJ, MEJ, MEI, NH
15  +, IFR, SR, MER, NORO, NOROJ
   COMMON/CAL/PQFU(5), PQFE(5), FQA(5), FVRU(15),
   QTAI, QTFU, QTFE, VTRU, VTO, VTA, VT, QTAU
   COMMON/SOM/XFACT, XU, FT1, FT2, ST1, ST2, XF1, XF2, HT, YV, YC(3), YU, YF1, YF2
   +, YF1J, YS1J, FT1J, ST1J
20  1 YS1, YS2, YFACT, YH, XE1, XE2, XIU, YU6, YC6(3), WI(3), WT(3), WFR(3), VI, VIF
   COMMON/DUMM/NC, NJ, NI, L2, L3, LIP, LYN
   COMMON/CONV/CONUT(3), CONUT2(3)
   DIMENSION CM(3), W(3), IND(25), QR(3)
   UNIT(Q, L1)=Q*CONUT(L1)

C  INITIALISATION
C
C  DO 1 I=1,5
   QAI(I)=0.0
   QAU(I)=0.0
   QFU(I)=0.0
   QFE(I)=0.0
30  DO 1 I=1,15
   C(I, I)=0.0
   1 CONTINUE
   DO 2 I=1,15
   VRU(I)=0.0
   VQU(I)=0.0
   PQFU(I)=0.0
   CFR(I)=0.0
35  2 CONTINUE
   QFU(6)=0.0
   QFE(6)=0.0
   DO 3 I=1,3
   CM(I)=0.0
   3 W(I)=0.0
   XFACT=0.0
   XF1=0.0
   XF2=0.0
   XU=0.0
   FT1=0.0
   FT1J=0.0
   FT2=0.0
   ST1=0.0
   ST1J=0.0
   ST2=0.0
   HT=0.0
   VI=0.0
   VIF=0.0
   XE1=0.0

```

```

XE2=0.0
WI(1)=0.0
WI(2)=0.0
WI(3)=0.0
WFR(1)=0.0
WFR(2)=0.0
WFR(3)=0.0

```

60

```

C LECTURE DES DONNEES
C
C

```

65

```

C LECTURE DU TITRE
C
C

```

```

READ(1,101) (WH(I),I=1,18)
WRITE (5,111) (WH(I),I=1,18)

```

70

```

C LECTURE DES VARIABLES DUMMY
C
C

```

```

READ (1,100) LFGM,LGC,LPO,L2,L3,LIP,LYN
WRITE(5,118) LFGM,LGC,LPO,L2,L3,LIP,LYN
READ (1,106) LU,(QAU(I),I=1,5)
MEMQUI=(LU, EQ, 0)

```

75

```

IF (MEMQUI) GO TO 14
WRITE (5,116) LU,(QAU(I),I=1,5)
DO 9 I=1,5

```

80

```

9 QAU(I)=UNIT(QAU(I),LU)
GO TO 414

```

```

14 WRITE (5,116) LU

```

```

414 READ (1,106) LU,(QFU(I),I=1,6)
WRITE (5,116) LU,(QFU(I),I=1,6)
DO 427 I=1,6

```

85

```

427 QFU(I)=UNIT(QFU(I),LU)
READ (1,106) LU,(QFE(I),I=1,6)
WRITE (5,116) LU,(QFE(I),I=1,6)
DO 415 I=1,6

```

90

```

415 QFE(I)=UNIT(QFE(I),LU)

```

```

C LECTURE DU FRACTIONNEMENT DES COUTS DE CONSTRUCTION ET DES COUTS ENT-
OF DE L'USINE
C
C

```

95

```

READ (1,105) (PVB(I),I=1,15)
WRITE (5,115) (PVB(I),I=1,15)
READ(1,105) (PVOU(J),J=1,15)
WRITE (5,115) (PVOU(J),J=1,15)

```

100

```

C LECTURE DES COUTS D'AMORTISSEMENT ANNUELS.
C
C

```

```

READ (1,104) VAE,VAI,VAU
WRITE (5,114) VAE,VAI,VAU

```

105

```

C LECTURE DES COUTS D'OPERATION
C
C

```

```

READ(1,104) VOE,VOI,VTOU,VZ
WRITE (5,114) VOE,VOI,VTOU,VZ

```

110

```

C LECTURE DES COUTS DE FACTURATION ET D'ECHANTILLONNAGE
C
C

```

```

READ(1,103) Y(9),Y(10)

```

```

115      WRITE(5,113) Y(9),Y(10)
      C
      C LECTURE DE L'ALLOCATION DES FRAIS ENTOP
      C
120      GOTO (90,91),LP0
      90 READ(1,103) PVOEY
      WRITE (5,113) PVOEY
      GO TO 92
      91 PVOEY=1.00
      92 CONTINUE
125      C
      C LECTURE DES DEBITS
      C
      C
      READ (1,103) POINTE
      WRITE (5,113) POINTE
      GO TO (10,11,13),LQC
130      10 READ (1,106) LU,(QAI(I),I=1,5)
      WRITE (5,116) LU,(QAI(I),I=1,5)
      QAI(5)=QAI(5)/POINTE
      DO 416 I=1,5
135      416 QAI(I)=UNIT(QAI(I),LU)
      C
      C LECTURE DES CONCENTRATIONS
      C
      C
      DO 52 I=1,5
      READ (1,102)(C(I,J),J=12,14)
      WRITE (5,112)(C(I,J),J=12,14)
140      52 CONTINUE
      C
      C QUALITE DU DEBIT INDUSTRIEL DE CONCEPTION DE L'USINE
      READ (1,102) (CFR(J),J=12,14)
      WRITE(5,112) (CFR(J),J=12,14)
      GO TO 95
145      11 CONTINUE
      C
      C LECTURE DU DEBIT A L'USINE
      C
      C
      READ (1,106) LU,QMA
      WRITE(5,116) LU,QMA
      QMA=UNIT(QMA,LU)
150      READ (1,102)(CM(I),I=1,3)
      WRITE(5,112)(CM(I),I=1,3)
      READ (1,104) POP
      WRITE(5,114) POP
      READ (1,100) LDEF
      WRITE(5,118) LDEF
155      C
      C
      GOTO (21,22),LDEF
160      21 READ (1,103) COM,(W(I),I=1,3),PQ3,PQ4
      WRITE(5,113) COM,(W(I),I=1,3),PQ3,PQ4
      GOTO 23
165      22 COM=400.0
      W(1)=80.0
      W(2)= 0.0
      W(3)=90.0
      PQ3 =0.10
      PQ4 =0.03
170      23 CONTINUE

```



```

175      GO TO 95
      13 CONTINUE
      C
      C LECTURE DES CARACTERISTIQUES DU DEBIT DOMESTIQUE
      C
      READ (1,104) POP
      WRITE(5,114) POP
      READ (1,100) LDEF
      WRITE(5,118) LDEF
180      C
      GOTO (24,25),LDEF
      24 READ (1,103) COM,(W(I),I=1,3)
      WRITE(5,113) COM,(W(I),I=1,3)
      GOTO 26
      25 COM=400.0
      W(1)=80.0
      W(2)= 0.0
      W(3)=90.0
185      26 CONTINUE
      C
      C LECTURE DES DEBITS ET DES QUALITES DE L'EAU D'INFILTRATION,
      C D'USAGE PUBLIC ET DE RUISSELLEMENT
      C
      READ (1,106) LU,(QR(I),I=1,3)
      WRITE(5,116) LU,(QR(I),I=1,3)
      QR(3)=QR(3)/POINTE
      DO 73 I=1,3
      QR(I)=UNIT(QR(I),LU)
      IK=I+2
      QAI(IK)=QR(I)
      73 CONTINUE
      DO 74 I=3,5
      READ (1,102) (C(I,J),J=12,14)
      WRITE(5,112) (C(I,J),J=12,14)
200      74 CONTINUE
      C
      C LECTURE DES PROFILS DES INDUSTRIES
      C
      95 IF (LQC .GT. 1 .OR. LPGM .EQ. 1) CALL LECTI
210      GO TO (120,130,140),LQC
      C
      C CALCUL DU DEBIT DOMESTIQUE
      C
      130 QAI(1)=POP*COM/1000.0
      DO 40 I=1,3
      J=11+I
      C(1,J)=POP*W(I)/QAI(1)
      40 CONTINUE
      DO 50 J=12,14
      C(2,J)=C(2,J)/QAI(2)
      CFR(J)=CFR(J)/QFU(6)
      50 CONTINUE
      X=QAI(1)+QAI(2)
      IF (X .LT. QMA) GO TO 51
      LSTOP=.TRUE.
220      68 FORMAT(/,10X,"LE DEBIT TOTAL EST PLUS FAIBLE QUE LA SOMME DES DEB
225

```

IIITS DOMESTIQUE ET INDUSTRIEL: VERIFIER LES DONNEES*)

WRITE(6,68)
RETURN

51 CONTINUE

C DEBIT D'INFILTRATION

C

235

QAI(3)=QMA*PQ3
X=QAI(1)+QAI(2)+QAI(3)
IF (QMA,GT,X) GOTO 64
QAI(3)=QMA-QAI(1)-QAI(2)

240

C CALCUL DE LA QUALITE DE L'EAU D'INFILTRATION

C

CALL AJUST (QMA,CM,QAI,2,2,1,C)
GO TO 120

245

C DEBIT D'USAGE PUBLIC

C

64 QAI(4)=QMA*PQ4

X=X+QAI(4)

IF (QMA,GT,X) GOTO 66

QAI(4)=QMA-QAI(1)-QAI(2)-QAI(3)

DO 65 JK=12,14

C(4,JK)=C(1,JK)

65 CONTINUE

CALL AJUST (QMA,CM,QAI,2,4,1,C)

GO TO 120

66 CONTINUE

DO 67 JK=12,14

C(4,JK)=C(1,JK)

67 CONTINUE

C DEBIT DE RUISSELLEMENT

C

QAI(5)=QMA-X

CALL AJUST (QMA,CM,QAI,1,4,5,C)

QAI(5)=QAI(5)/POINTE

GO TO 120

C CALCUL DU DEBIT DOMESTIQUE

C

140 QAI(1)=POP*COM/1000.0

DO 340 I=1,3

J=11+I

C(1,J)=POP*W(I)/QAI(1)

340 CONTINUE

DO 150 J=12,14

C(2,J)=C(2,J)/QAI(2)

CFR(J)=CFR(J)/QFU(6)

150 CONTINUE

120 QFU(2)=QFU(2)+QFU(6)

QFE(2)=QFE(2)+QFE(6)

C LECTURE DES PROFILS DES CATEGORIES DE CONTRIBUABLES

C

IF (LPGM ,EQ. 1) CALL LECTC

285

C
C
C

LECTURE DES PROFILS DES CONTRIBUABLES INDIVIDUELS

```
290 IF (LPGM .EQ. 1) CALL LECTJ
    IF (.NOT. MEMQUI) RETURN
    DO 417 I=1,4
      QAU(I)=QAI(I)
417 CONTINUE
    QAU(5)=QAI(5)*POINTE
295 100 FORMAT (40I2)
    101 FORMAT (20A4)
    102 FORMAT (12F6.0)
    103 FORMAT (8F10.0)
    104 FORMAT (6F12.0)
    105 FORMAT (10F5.0)
    106 FORMAT (12,6F10.0)
    111 FORMAT ('1',20A4)
    112 FORMAT (1X,12F6.1)
    113 FORMAT (1X,8F10.2)
    114 FORMAT (1X,6F12.2)
    115 FORMAT (1X,10F5.2)
    116 FORMAT (1X,12,6F10.2)
    117 FORMAT (1X,16I5)
    118 FORMAT (1X,40I2)
310 RETURN
    END
```



```

1  SUBROUTINE CALPRE
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VBU(15),WH(20),
1  VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2  PVOU(15),VTOU,QAU(5),LSTOP,LPGM,CFR(15),QF2,
3  CF2(3),LQC
5  COMMON/CAL/QFU(5),PQFE(5),PQA(5),PVB(15),
1  QTAI,QTFU,QTFE,VTO,VTA,VT,QTAU
C  CALCULS PRELIMINAIRES
DIMENSION SAGE1(4,5)
DATA SAGE1/'DOME','STIQ','UE','INDU','STRI','EL',
1  'INFI','LTRA','TION','USAG','E PU','BLIC',
2  'RUIS','SELL','EMEN','T'
C  TOLERANCE DES REELS POUR LES DEBITS EN M3/J
DATA TOL/0.001/
C  INITIALIZATION
QTAU=0.0
QTAI=0.0
QTFU=0.0
QTFE=0.0
VTO=VDE+V0I
C
DO 10 I=1,5
IF (I.EQ. 3).OR. (I.EQ. 5)) GO TO 9
X=POINTE*QAI(I)-TOL
IF (X.GT.QFE(I)) WRITE(6,8)
7771 IF (X.GT.QFE(I)) WRITE(6,7772) I,POINTE,QAI(I),X,QFE(I)
7772 FORMAT(1X,I2,4F13.5)
9  CONTINUE
IF (QAU(I)-TOL.GT.QFU(I)) WRITE (6,15) (SAGE1(K,I),K=1,4)
15 FORMAT (////,' LE DEBIT DE CONCEPTION---',4A4,' EST PLUS FAIBLE QU
1E LE DEBIT ACTUEL-----> CORRIGER',////)
QTAU=QTAU+QAU(I)
QTAI=QTAI+QAI(I)
QTFU=QTFU+QFU(I)
QTFE=QTFE+QFE(I)
10 CONTINUE
8  FORMAT (//,'X',LES DEBITS DE CONCEPTION DE L'INTERCEPTEUR NE PEUV
1ENT ETRE PLUS FAIBLES QUE POINTE X LES DEBITS ACTUELS')
IF (QFU(2).LT.QFU(6)-TOL) WRITE (6,14)
X=QAI(2)*POINTE-TOL
IF (X.GT.QFE(6)) WRITE (6,16)
14 FORMAT (//,' LE DEBIT RESERVE INDUSTRIEL DE CONCEPTION DE L'USINE
+ DOIT ETRE PLUS GRAND QUE LE DEBIT INDUSTRIEL ACTUEL')
16 FORMAT (//,' LE DEBIT RESERVE INDUSTRIEL DE CONCEPTION DE L'INTER
+CEPTEUR',
+ DOIT ETRE PLUS GRAND QUE LA POINTE * LE DEBIT INDUSTRIEL ACTUEL')
DO 11 I=1,5
PQA(I)=QAI(I)/QTAI
PQFU(I)=QFU(I)/QTFU
PQFE(I)=QFE(I)/QTFE
11 CONTINUE
DO 13 J=1,15

```

SUBROUTINE CALPRE 73/173 OPT=1

```
        VOU(J)=VTOU*PVOU(J)
        VTO=VTO+VOU(J)
13      CONTINUE
        VTA=VAE+VAI+VAU
        VT=VTO+VTA+VZ
        RETURN
      END
```

60

```
1 SUBROUTINE ALLOC
C ALLOCATION DES COUTS ENTRE USAGERS-PROPRIETE
C
5 COMMON/DAT/QAI(5),QFUK(6),QFE(6),C(5,15),VBU(15),VQU(15),WH(20),
1 VAE,VAI,VAU,VOE,VOI,VZ,PVOEX,PVOIY,PVOUY,POINTE,
2 PVOU(15),VTOU,GAU(5),LSTOP,LPGM,CFR(15),QF2,
3 CF2(3),LQC
10 COMMON/CAL/PQFU(5),POFE(5),PQA(5),PVB(15),
1 QTAI,QTFU,QTFE,VTEU,VTO,VTA,VT,QTAU
2 COMMON/ALL/MTA(15),WTF(15),PVAUX(15),PVAUY(15),
1 PVAIY,PVAIX,PVOEX,PVOIX,PVOUX,
2 P3M(15),P3MR(15),P3NR(15),
3 P1M,P1MR,P1MC,P2M,P2NR,P2MC,P2MR,P2NC,P2NR,P4M,P4MR,P4MC
4 P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
15 C INITIALISATION
C
DO 2 J=1,15
20 WTA(J)=0.0
WTF(J)=0.0
PVAUY(J)=0.0
PVAUX(J)=0.0
P3M(J)=0.0
P3MR(J)=0.0
P3NR(J)=0.0
WFR(J)=0.0
P3XFR(J)=0.0
2 CONTINUE
30 PVAIY=0.0
PVAIX=0.0
PVOEX=0.0
PVOIX=0.0
PVOUX=0.0
P1M=0.0
P1MR=0.0
P1MC=0.0
P2M=0.0
P2NR=0.0
P2NC=0.0
P2MR=0.0
P2MC=0.0
P2NR=0.0
P2NC=0.0
P4M=0.0
P4MR=0.0
P4MC=0.0
P5N=0.0
P5NR=0.0
P5NC=0.0
P6N=0.0
P6NR=0.0
P6NC=0.0
45 C ALLOCATION DES COUTS FIXES DU RESEAU
C
55 P1M=1.0
P1MR=QAI(5)/QTAI
IF (P1MR.GT.P1M) P1MR=P1M
```


P1MC=P1M-P1MR

60 C
C
C

ALLOCATION DES COUTS FIXES DE L'INTERCEPTEUR

65 PVAIX=POINTE*(QAI(1)+QAI(2)+QAI(3))/QTFE
IF (PVAIX.GT.1.0) PVAIX=1.0
P2XFR=(QFE(6)-POINTE*QAI(2))/QTFE
PVAIY=1.0-PVAIX-P2XFR
P2M=(QAI(4)+QAI(5))*POINTE/QTFE
IF (P2M.GT.PVAIY) P2M=PVAIY
P2N=PVAIY-P2M
P2MR=QAI(5)*POINTE/QTFE
IF (P2MR.GT.P2M) P2MR=P2M
P2MC=P2M-P2MR
P2NR=(QFE(5)-QAI(5)*POINTE)/QTFE
IF (P2NR.GT.P2N) P2NR=P2N
P2NC=P2N-P2NR

70

75 C
C
C

ALLOCATION DES COUTS FIXES DE L'USINE

80 DO 10 J=12,14
DO 11 I=1,5
CONC=C(I,J)
IF (I.EQ.2) CONC=CFR(J)
WTF(J)=WTF(J)+QFU(I)*CONC*0.001
WTA(J)=WTA(J)+RAU(I)*C(I,J)*0.001
11 CONTINUE
WFR(J)=(QFU(6)*CFR(J)-QAU(2)*C(2,J))*0.001
IF (WTF(J).LT.1.0) GOTO 10
PVAUY(J)=(WTF(J)-WTA(J)-WFR(J)+(QAU(4)*C(4,J)+QAU(5)*C(5,J))*0.001
+)/WTF(J)
P3XFR(J)=WFR(J)/WTF(J)
PVAUX(J)=1.0-PVAUY(J)-P3XFR(J)
P3M(J)=(QAU(4)*C(4,J)+QAU(5)*C(5,J))*0.001/WTF(J)
P3MR(J)=QAU(5)*C(5,J)*0.001/WTF(J)
P3NR(J)=(QFU(5)-QAU(5)*C(5,J))*0.001/WTF(J)

11

90

10

95 PVAUY(10)=PVAIY
PVAUX(10)=PVAIX
P3XFR(10)=P2XFR
P3XFR(11)=(QFU(6)-QAU(2))/QTFU
PVAUX(11)=(QAU(1)+QAU(2)+QAU(3))/QTFU
PVAUY(11)=1.0-PVAUX(11)-P3XFR(11)
P3M(11)=(QAU(4)+QAU(5))/QTFU
P3MR(10)=P2MR
P3MR(11)=QAU(5)/QTFU
P3NR(10)=P2NR
P3NR(11)=(QFU(5)-QAU(5))/QTFU

105

C
C
C

ALLOCATION DES COUTS ENTOP DU RESEAU

110 PVOEX=1.0-PVOEY
P4M=PVOEY
P4MR=QAI(5)/QTAI
IF (P4MR.GT.P4M) P4MR=P4M
P4MC=P4M-P4MR

C

115 C ALLOCATION DES COUTS ENTOP DE L'INTERCEPTEUR

C

P5XFR=P2XFR*.30
PVOIY=(QTFE-POINTE*QTAI)/QTFE*0.30-P5XFR
PVOIX=1.0-PVOIY-P5XFR
PSN=PVOIY
P5NR=P5N*P2NR/PVAIY
PSNC=PSN-P5NR

120

C ALLOCATION DES COUTS ENTOP DE L'USINE

C

P6XFR=(QFU(6)-QAU(2))/QTFU*.30
PVOUY=(QTFU-QTAU)/QTFU*0.30-P6XFR
IF (PVOUY.LT.0.0001) PVOUY=0.0
PVOUX=1.0-PVOUY-P6XFR
RETURN
END

125

130

```

1      SUBROUTINE COUTS
C      CALCUL DES COUTS USAGERS-PROPRIETE
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VEU(15),VOU(15),WH(20),
1      VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2      PVOU(15),VTOU,RAU(5),LSTOP,LPGM,CFR(15),QF2,
3      CF2(3),LQC
COMMON/CAL/PQFU(5),PQFE(5),PQA(5),PVEU(15),
1      QTAI,QTIFU,QTFE,VTBU,VTO,VTA,VT,QTAV
COMMON/ALL/WT(15),WTF(15),PVAUX(15),PVAUY(15),
1      PVAIX,PVAIX,PVOEX,PVOIX,PVOUX,
2      P3M(15),P3MR(15),P3NR(15),
3      P1M,P1MR,P1MC,P2M,P2N,P2MR,P2MC,P2NR,P2NC,P4M,P4MR,P4MC
4      P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
COMMON/COU/VAUY(15),VAUX(15),VOUY(15),VOUX(15),
1      VAEY,VAIY,VAIX,PVTAUY,PVTAUX,PVOEY,PVOEX,PVOIY,PVOIX,
2      PVTOY,PVTOX,PVTAY,PVTAX,PVTY,
3      V3M(15),V3MR(15),V3NR(15),
4      P3MT,P3NT,P3MRT,P3MCT,P3NRT,P3NCT,V6N,V6NR,V6NC
5      V2XFR,V3XFR(15),PT3XFR,V5XFR,V6XFR(15),
6      PTOXFR,PTAXFR,PTXFR

```

INITIALISATION

```

C
C
C

```

```

25      DO 11 J=10,15
        VAUY(J)=0.0
        VAUX(J)=0.0
        V3M(J)=0.0
        V3MR(J)=0.0
        V3NR(J)=0.0
        VOUY(J)=0.0
        VOUX(J)=0.0
        V3XFR(J)=0.0
        V6XFR(J)=0.0
35      11 CONTINUE
        PVTAUY=0.0
        PVTAUX=0.0
        PT3XFR=0.0
        P3MT=0.0
        P3NT=0.0
        P3MRT=0.0
        P3MCT=0.0
        P3NRT=0.0
        P3NCT=0.0
        PVTAUX=0.0
        PVTAUY=0.0
        PTAXFR=0.0
        PTOXFR=0.0
        PVTOY=0.0
        PVTOX=0.0
        V6N=0.0
        V6NR=0.0
        V6NC=0.0

```

```

C      CALCUL DES COUTS FIXES Y-X DU RESEAU ET DE L'INTERCEPTEUR
C

```

```

VAEY=VAE

```



```

60      VAIY=VAI*PVAIY
        VAIX=VAI*PVAIX
        C
        C  CALCUL DES COUTS FIXES X-Y DE L'USINE
        C
        V2XFR=VAI*P2XFR
        IF (VAV.LT.1.0) GOTO 15
        DO 10 J=10,14
            VAIY(J)=VAV*PVAUY(J)*PVBUB(J)
            VAIY(J)=VAV*PVAUX(J)*PVBUB(J)
            V3M(J)=VAV*PVBUB(J)*P3M(J)
            V3XFR(J)=VAV*P3XFR(J)*PVBUB(J)
            V3MR(J)=VAV*PVBUB(J)*P3MR(J)
            V3NR(J)=VAV*PVBUB(J)*P3NR(J)
        10 CONTINUE
        PVTAY= (VAV(10)+VAVY(11)+VAVY(12)+VAVY(13)+VAVY(14))/
            (VAV*(1.0-PVBUB(15)))
        1  PT3XFR=(V3XFR(10)+V3XFR(11)+V3XFR(12)+V3XFR(13)+V3XFR(14))/(VAV*(
            +1.0-PVBUB(15)))
        PVTAX=1.0-PVTAY-PT3XFR
        VAV(15)=VAV*PVTAY*PVBUB(15)
        VAV(15)=VAV*PVTAX*PVBUB(15)
        V3XFR(15)=VAV*PT3XFR*PVBUB(15)
        P3MT= (V3M(10)+V3M(11)+V3M(12)+V3M(13)+V3M(14))
            / (VAV*(1.0-PVBUB(15)))
        1  P3MRT=(V3MR(10)+V3MR(11)+V3MR(12)+V3MR(13)+V3MR(14))
            / (VAV*(1.0-PVBUB(15)))
        1  P3NRT=(V3NR(10)+V3NR(11)+V3NR(12)+V3NR(13)+V3NR(14))
            / (VAV*(1.0-PVBUB(15)))
        1  P3NT=PVTAY-P3MT
        P3MCT=P3MT-P3MRT
        P3NCT=P3NT-P3NRT
        15 CONTINUE
        C
        C  CALCUL DES COUTS ENTOP X-Y DU RESEAU
        C
        VOEY=VOE*PVOEY
        VOEX=VOE*PVOEX
        VOIY=VOI*PVOIY
        VOIX=VOI*PVOIX
        V5XFR=VOI*P5XFR
        C
        C  CALCUL DES COUTS ENTOP X-Y DE L'USINE
        C
        IF (VTO.LT.1.0) GOTO 25
        DO 20 J=11,14
            VOIY(J)=VOU(J)*PVOUY
            VOIX(J)=VOU(J)*PVOUX
            V6XFR(J)=VOU(J)*P6XFR
        20 CONTINUE
        PVTOT=(VOEY+VOIY+VOUY(11)+VOUY(12)+VOUY(13)+VOUY(14))/
            (VTO-VOU(15))
        1  PTOXFR=(V5XFR+V6XFR(11)+V6XFR(12)+V6XFR(13)+V6XFR(14))
            / (VTO-VOU(15))
        PVTOTX=1.0-PVTOT-PTOXFR
        V6XFR(15)=VOU(15)*PTOXFR
        VOUY(15)=VOU(15)*PVTOT
        110

```

```
115      VOUX(15)=VOU(15)*PVTX  
      V6N=VOUY(11)+VOUY(12)+VOUY(13)+VOUY(14)+VOUY(15)  
      V6NR=V6N*(QFU(5)-QAU(5))/QTFU  
      V6NC=V6N-V6NR  
C  
C      CALCUL DES TAUX D'ALLOCATION GLOBAUX  
C  
      25 IF (VTA.LT.1.0) GOTO 30  
      PVTAY=(VAEY+VALY+VAU*PVTAY)/VTA  
      PVTAX=(VAE-VAEY+VAIX+VAU*PVTAX)/VTA  
      PTXFR=1.0-PVTAY-PVTAX  
      PVTY=(VT0*PVTAY+(VTA+VZ)*PVTAY)/VT  
      PVTX=(VT0*PVTX+(VTA+VZ)*PVTX)/VT  
      PTXFR=1.0-PVTY-PVTX  
      RETURN  
30 CONTINUE  
      PVTY=((VT0+VZ)*PVTY+VTA*PVTAY)/VT  
      PVTX=((VT0+VZ)*PVTX+VTA*PVTAX)/VT  
      PTXFR=1.0-PVTX-PVTY  
      RETURN  
END  
135
```



```
1 SUBROUTINE TARIF
C ALLOCATION DES COUTS A L'USAGER PAR POSTE
C
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VRU(15),VOU(15),WH(20),
1 VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2 PVOU(15),VTOU,RAU(5),LSTOP,LPGM,CFR(15),QF2,
3 CF2(3),LQC
COMMON/CAL/PQFU(5),PQFE(5),PQA(5),PVRU(15),
1 QTAI,QTFU,QTFE,VIBU,UTO,UTA,VT,QTAU
2 COMMON/ALL/WTAF(15),PVAUX(15),PVAUY(15),
3 PVAIY,PVAIX,PVOEX,PVOIX,PVOUX,
4 P3M(15),P3MR(15),P3NR(15),
5 P1M,P1MR,P1MC,P2M,P2NR,P2MC,P2NR,P2NC,P4M,P4MR,P4MC
6 P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
COMMON/COU/VAUY(15),VAUX(15),VOUY(15),VOUX(15),
1 VAEY,VAIY,VAIX,PVTAUY,PVTAUX,VOEY,VOEX,VOIY,VOIX,
2 PVTOY,PVTOX,PVTAY,PVTAX,PVTY,
3 V3M(15),V3MR(15),V3NR(15),
4 P3MT,P3NT,P3MRT,P3MCT,P3NRT,P3NCT,V6N,V6NR,V6NC
5 V2XFR,V3XFR(15),PT3XFR,V5XFR,V6XFR(15),
6 PTOXFR,PTAXFR,PTXFR
COMMON/TAR/PVX0(15),VOX(15),PVAX(15),VAX(15),PVZX(15),VZX(15),
1 PVGX(15),VGX(15),
2 POMRT,POMCT,PONRT,PONCT,
3 VOMRT,VOMCT,VONRT,VONCT,VTOY,VTOX,
4 PAMRT,PAMCT,PANRT,PANCT,
5 VAMRT,VAMCT,VANRT,VANCT,VTAY,VTAX,
6 PZMR,PZMC,PZNR,PZNC,PVIZY,PVIZX,
7 VZMR,VZMC,VZNR,VZNC,VTZY,VTZX,
8 PTMR,PTMC,PTNR,PTNC,
9 VTMR,VTMC,VTNR,VTNC,VTY,VTX
1 VAXFR(15),VOXFR(15),POXFR(15),PAXFR(15),VTOXFR,VTAXFR,VTZXFR
2 PTZXFR,VZXFR(15),PZXFR(15),VGXFR(15),PGXFR(15),VTXFR
C INITIALISATION
C
DO 2 J=10,15
PVAX(J)=0.0
PVX0(J)=0.0
POXFR(J)=0.0
PAXFR(J)=0.0
VZX(J)=0.0
VZXFR(J)=0.0
PZXFR(J)=0.0
PVZX(J)=0.0
2 CONTINUE
FAMRT=0.0
FAMCT=0.0
PANRT=0.0
PANCT=0.0
POMRT=0.0
POMCT=0.0
PONRT=0.0
PONCT=0.0
C REPARTITION DES COUTS DIVERS (15)
C
```



```

60 VAUX(11)=VAUX(11)+VAUX(10)
   SUM1=VAUX(11)+VAUX(12)+VAUX(13)+VAUX(14)
   SUM2=VOUX(11)+VOUX(12)+VOUX(13)+VOUX(14)
   V3XFR(11)=V3XFR(10)+V3XFR(11)
   SUM3=V3XFR(11)+V3XFR(12)+V3XFR(13)+V3XFR(14)
   SUM4=V6XFR(11)+V6XFR(12)+V6XFR(13)+V6XFR(14)
   IF (SUM1.LT.1.0) SUM1=1.0
   IF (SUM2.LT.1.0) SUM2=1.0
   IF (SUM3.LT.1.0) SUM3=1.0
   IF (SUM4.LT.1.0) SUM4=1.0
   DO 10 J=11,14
   VAUX(J)= VAUX(J)+VAUX(J)*VAUX(15)/SUM1
   VOUX(J)= VOUX(J)+VOUX(J)*VOUX(15)/SUM2
   V3XFR(J)=V3XFR(J)+V3XFR(J)*V3XFR(15)/SUM3
   V6XFR(J)=V6XFR(J)+V6XFR(J)*V6XFR(15)/SUM4
10 CONTINUE
   VAUX(15)=0.0
   VOUX(15)=0.0
   V3XFR(15)=0.0
   V6XFR(15)=0.0

80 C
   C SOMME DES COUTS PAR POSTE
   C
   VAX(11)= VAUX(11)+VAIX
   VOX(11)= VOUX(11)+VOEX+VOIX
   VAXFR(11)=V3XFR(11)+V2XFR
   VOXFR(11)=V6XFR(11)+V5XFR
   IF (VTO.GT.1.0) POXFR(11)=VOXFR(11)/VTO
   IF (VTA.GT.1.0) PAXFR(11)=VAXFR(11)/VTA
   IF (VTO.GT.1.0) PVOX(11)=VOX(11)/VTO
   IF (VTA.GT.1.0) PVAX(11)=VAX(11)/VTA
   DO 20 J=12,15
   VAX(J)=VAUX(J)
   VOX(J)=VOUX(J)
   VAXFR(J)=V3XFR(J)
   VOXFR(J)=V6XFR(J)
   IF (VTO.GT.1.0) POXFR(J)=VOXFR(J)/VTO
   IF (VTA.GT.1.0) PAXFR(J)=VAXFR(J)/VTA
   IF (VTO.GT.1.0) PVOX(J)=VOX(J)/VTO
   IF (VTA.GT.1.0) PVAX(J)=VAX(J)/VTA
20 CONTINUE

100 C
   VAMRT=VAE*P1MR+VAI*P2MR+VAU*P3MR
   VAMCT=VAE*P1MC+VAI*P2MC+VAU*P3MCT
   VANRT=
     VAI*P2NR+VAU*P3NR
   VANCT=
     VAI*P2NC+VAU*P3NCT
   VOMRT=VOE*P4MR
   VOMCT=VOE*P4MC
   VONRT=
     VOI*P5NR+V6NR
   VONCT=
     VOI*P5NC+V6NC

110 C
   IF (VTA.LT.1.0) GOTO 11
   FAMRT=VAMRT/VTA
   FAMCT=VAMCT/VTA
   PANRT=VANRT/VTA
   PANCT=VANCT/VTA
11 CONTINUE

```

```

115 IF (VTO,LT,1.0) GOTO 12
    POMRT=VOMRT/VTO
    POMCT=VOMCT/VTO
    PONRT=VONRT/VTO
    PONCT=VONCT/VTO
120 12 CONTINUE
    VTOX=VTOX*VTO
    VTOY=VTOY*VTO
    VTAY=VTAY*VTA
    VTAX=VTAX*VTA
    VTOXFR=PTOXFR*VTO
    VTAXFR=PTAXFR*VTA
125
C
C
C REPARTITION DES COUT AMELIORATIONS
C
130 IF (VTA,LT,1.0) GOTO 22
    VTZY=VZ*PVTA
    VTZX=VZ*PVTA
    VTZXFR=VZ*PTAXFR
    PVZY=PVTA
    PVTZ=PVTA
    PTZXFR=PTAXFR
    PZMR=PAMRT
    PZMC=FAMCT
    PZNR=PANRT
    PZNC=PANCT
    VZMR=VZ*PZMR
    VZMC=VZ*PZMC
    VZNR=VZ*PZNR
    VZNC=VZ*PZNC
140 DO 21 J=1,15
    VZX(J)=VZ*PVAX(J)
    PVZX(J)=PVAX(J)
    VZXFR(J)=VZ*PAXFR(J)
    PZXFR(J)=PAXFR(J)
145 21 CONTINUE
150 21 GOTO 23
    PZMR=POMRT/(1.0-PVX0(15))
    PZMC=POMCT/(1.0-PVX0(15))
    PZNR=PONRT/(1.0-PVX0(15))
    PZNC=PONCT/(1.0-PVX0(15))
    VZMR=VZ*PZMR
    VZMC=VZ*PZMC
    VZNR=VZ*PZNR
    VZNC=VZ*PZNC
155 DO 24 J=1,14
    PVZX(J)=PVX0(J)/(1.0-PVX0(15))
    VZX(J)=VZ*PVZX(J)
    VZXFR(J)=VZ*PZXFR(J)
160 24 CONTINUE
    VTZY=VZMR+VZMC+VZNR+VZNC
    VTZX=VZX(11)+VZX(12)+VZX(13)+VZX(14)
    VTZXFR=VZXFR(11)+VZXFR(12)+VZXFR(13)+VZXFR(14)
165 IF (VZ) 26,26,27
170 27 PTZXFR=VTZXFR/VZ
    PVTZ=VTZY/VZ
    PVTZ=VTZX/VZ

```

```
175      GO TO 23
      26 PTZFR=0.0
      PUTZY=0.0
      PUTZX=0.0
      23 DO 25 J=1,15
      VGX(J)=VAX(J)+VDX(J)+VZX(J)
      PVGX(J)=VGX(J)/VT
      180 VGXFR(J)=VAXFR(J)+VOXFR(J)+VZXFR(J)
      PGXFR(J)=VGXFR(J)/VT
      25 CONTINUE
      VTY=VTOY+VTAY+VTZY
      VTX=VTOX+VTAX+VTZX
      VTXFR=VTOXFR+VTAXFR+VTZXFR
      185 PTXFR=VTXFR/VT
      PUTY=VTY/VT
      PVTX=VTX/VT
      VTMR=VOMRT+VAMRT+VZMR
      VTMC=VOMCT+VAMCT+VZMC
      VTNR=VONRT+VANRT+VZNR
      VTNC=VONCT+VANCT+VZNC
      190 PTMR=VTMR/VT
      PTMC=VTMC/VT
      PTNR=VTNR/VT
      PTNC=VTNC/VT
      RETURN
      END
```



```

1  SUBROUTINE IMPR1
   LOGICAL LSTOP
   COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VBU(15),WH(20),
   VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
   PVOU(15),VTOU,QAU(5),LSTOP,LPGM,CFR(15),QF2,
   CF2(3),LQC
5  COMMON/CAL/PQFU(5),PQFE(5),PQA(5),PVB(15),
   QTAI,QTFU,QTFE,VTOU,VTA,VT,QTAU
10  DIMENSION SAGE1(4,5),SAGE2(3,6)
   DIMENSION QAK(5),QFUK(6),QFEK(6),PQAK(5),PQFUK(5),PQFEK(5),
   + PQAK(5),PQFUK(5)
   DIMENSION PVB(15),PVB(15)

C
15  DATA SAGE1/'DOME','STIQ','UE','INDU','STRI','EL',
   1,'INF','LTRA','TION','USAG','E PU','BLIC',
   2,'RUIS','SELL','EMEN','T',
   DATA SAGE2/'VOLI','ME E','GOUT','VOLI','ME U','SINE',
   1,'DRO','A','UTRE','MS',
   2,'ZERS'

C
20  WRITE (6,99) (WH(I),I=1,18)
99  FORMAT ('1',20A4)
   SQAI5=QAI(5)
   SQTAI=QTAI
   QTAI=QTAI-QAI(5)
   QAI(5)=QAI(5)*POINTE
   QTAI=QTAI+QAI(5)
   DO 10 I=1,5
   QAK(I)=QAI(I)/4546.
   QAK(I)=QAU(I)/4546.
   QFUK(I)=QFU(I)/4546.
   QFUK(I)=QFU(I)/4546.
   QFEK(I)=QFE(I)/4546.
   PQAK(I)=QAI(I)*100.0/QTAI
   PQAK(I)=QAU(I)*100.0/QTAU
   PQFUK(I)=PQFU(I)*100.0
   PQFEK(I)=PQFE(I)*100.0
10  CONTINUE
   QFUK(6)=QFU(6)/4546.
   QFEK(6)=QFE(6)/4546.
   DO 11 J=10,15
   PVB(10)=PVB(J)*100.0
   IF (J.GT.10) PVB(J)=PVB(J)*100.0
11  CONTINUE
   QPASS=QTAI-QTAU
   QTAU=QTAI/4546.
   QTAU=QTAU/4546.
   QTFUK=QTFU/4546.
   QTFEK=QTFE/4546.

C
50  C IMPRESSION DES DEBITS
C
   WRITE(6,100)
100  FORMAT (///,41X,"DONNEES LUES OU GENEREES PAR LE PROGRAMME")
101  WRITE(6,101)
101  FORMAT (///,5X,"DEBITS")
   WRITE (6,158) POINTE
158  FORMAT (/,30X,"FACTEUR DE MAJORATION DU DEBIT MOYEN:",F6.2,/)

```

```

60      WRITE(6,102)
102     FORMAT(49X,"DEBITS ACTUELS"/)
      WRITE(6,164)
164     FORMAT(51X,5X,"A L""USINE",5X,19X,"DANS L""INTERCEPTEUR")
      WRITE(6,103)
103     FORMAT(53X,"M3/J  MG/J  %",21X,"M3/J  MG/J  %",/)
      DO 104 I=1,5
104     CONTINUE
      WRITE(6,105) (SAGE1(K,I),K=1,4),QAU(I),QAU(I),QPAUK(I),QAI(I),
      + QAK(I),PQAK(I)
105     CONTINUE
      WRITE(6,136) QTAU,QTAUK,QTAI,QTAK
136     FORMAT(34X,2(12X,12(1H_))1X,6(1H_))1X,5(1H_))//,
      + 40X,"TOTAL",F13.1,F7.2," 100.0",11X,F13.1,F7.2," 100.0")
105     FORMAT(30X,44X,F12.1,F7.2,F6.1,12X,F12.1,F7.2,F6.1)
      IF ((QPASS,GT,0.01).AND.(QTAI,GT,QTFU)) WRITE(6,162) QPASS
      WRITE(6,106)
106     FORMAT(///,51X,"DEBITS DE CONCEPTION",17X,"DEBITS DE CONCEPTION")
      WRITE(6,107)
107     FORMAT(56X,"DE L USINE",24X,"DE L""INTERCEPTEUR")
      DO 108 I=1,5
108     CONTINUE
      WRITE(6,105) (SAGE1(K,I),K=1,4),QFU(I),QFUK(I),PQFUK(I),
      + QFE(I),QFEK(I),PQFEK(I)
109     CONTINUE
      WRITE(6,136) QIFU,QTFUK,QTFE,QTFEK
      WRITE(6,139) QFU(6),QFUK(6),QFE(6),QFEK(6)
139     FORMAT(///,21X,"DEBIT RESERVE INDUSTRIEL",7X,"DE L""USINE",
      + 24X,"DE L""INTERCEPTEUR",
      + //,21X,"DE CONCEPTION",12X,F12.1,F7.2,19X,F12.1,F7.2)
162     FORMAT(///,10X,"UN DEBIT DE",F12.1," M3/J EST DERIVE A L""ENTRE
      + 1E DE L""USINE D""EPURATION",////)
      QAI(5)=SQAI5
      QTAI=SQTAI
90      C
      C QUALITE DE L'EAU
      C
      WRITE(6,120)
120     FORMAT(///,1H1,4X,"QUALITE DE L EAU")
      WRITE(6,121)
121     FORMAT(50X,"DBO  AUTRE  MS")
      WRITE(6,122)
122     FORMAT(49X,"MG/L  MG/L  MG/L")
      DO 123 I=1,5
123     CONTINUE
      WRITE(6,124) (SAGE1(K,I),K=1,4),(C(I,J),J=12,14)
124     FORMAT(30X,44X,3F8.1)
      WRITE(6,126) (CFR(J),J=12,14)
126     FORMAT(/,11X,"INDUSTRIEL FUTUR RESERVE",11X,3F8.1)
      IF (LOC,NE,1) LSTOP=,TRUE.
      IF (LSTOP) RETURN
      C
      C COUT DE CONSTRUCTION DE L'USINE
      C
      WRITE(6,130)
130     FORMAT(///,5X,"REPARTITION DES COUTS DE CONSTRUCTION ET D ENT-OP
      + 1DE L USINE")
      WRITE(6,138)
138     FORMAT(/,48X,"CONSTRUCTION  ENT-OP")

```



```

115      WRITE (6,131)
131      FORMAT (30X,"COUT AFFECTE PAR:")
      WRITE (6,132)
132      FORMAT (32X,"ITEM      CODE",8X,"%",11X,"%")
      WRITE (6,137) (SAGE2(K,1),K=1,3),PVBUK(10)
137      FORMAT(/,30X,3A4,"  10",5X,F5.1,8X,"-----")
      DO 133 J=11,15
      JK=J-9
      WRITE (6,134) (SAGE2(K,JK),K=1,3),J,PVBUK(J),PVBUK(J)
133      CONTINUE
134      FORMAT(30X,3A4,I4,F10.1,F12.1)
      WRITE (6,135)
135      FORMAT(51X,5(1H_),7X,5(1H_)/,
+         42X,"TOTAL      100.0      100.0")
C
C
130      WRITE (6,150)
150      FORMAT (//,5X,"SOMMAIRE DES DEPENSES ANNUELLES")
      WRITE (6,151) V0E
151      FORMAT (/,30X,"OPERATION: RESEAU",9X,1H$,F14.2)
      WRITE (6,161) V0I
161      FORMAT (41X,"INTERCEPTEUR",4X,F14.2)
      WRITE (6,159) VTOU
159      FORMAT (41X,"USINE",11X,F14.2)
      WRITE (6,155) VTO,VTO
      WRITE (6,152) V0E
152      FORMAT (//,30X,"AMORTISSEMENT: RESEAU      $",F14.2)
      WRITE (6,153) VAI
153      FORMAT(45X,"INTERCEPTEUR",F14.2)
      WRITE (6,154) V0U
154      FORMAT(45X,"USINE",7X,F14.2)
      WRITE (6,155) VTA,VTA
155      FORMAT(57X,14(1H_)/,
+         45X,"SOUS-TOTAL $",F14.2,1X,F14.2)
      WRITE (6,156) VZ
156      FORMAT (/,30X,"AMELIORATIONS",29X,F14.2)
      WRITE (6,157) VT
157      FORMAT(72X,14(1H_)/,
+         30X,"TOTAL",36X,1H$,F14.2)
      RETURN
      END

```

155


```

1  SUBROUTINE IMPR2
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VOU(15),WH(20),
1  VAE,VAI,VAU,VOE,VOI,VZ,PVOEX,PVOIY,PVOUY,POINTE,
2  PVOU(15),VTOU,QU(5),LSTOP,LPGM,CFR(15),QF2,
3  CF2(3),LQC
5  COMMON/ALL/WTA(15),WTF(15),PVAUX(15),PVAUY(15),
1  PVAIX,PVAIX,PVOEX,PVOIX,PVOUX,
2  P3M(15),P3MR(15),P3NR(15),
3  P1M,P1MR,P1MC,P2M,P2N,P2MR,P2MC,P2NR,P2NC,P4M,P4MR,P4MC
10 4,P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
COMMON/COU/VAU(15),VAUX(15),VOU(15),VOUX(15),
1  VAEY,VAIX,VAIX,PVTAUX,PVTAUX,PVOEX,PVOEX,PVOIY,PVOIY,
2  PVTOY,PVTOX,PVTAY,PVTAX,PVTY,
3  V3M(15),V3MR(15),V3NR(15),
15 3MT,P3NT,P3MT,P3MCT,P3NCT,P3NCT,V6N,V6NR,V6NC
5,V2XFR,V3XFR(15),PT3XFR,V5XFR,V6XFR(15),
6PTOXFR,PTAXFR,PTXFR
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
20 DIMENSION PVAUM(15),PVAUN(15),SAGE2(3,6),P3XFR0(15)
DATA SAGE2/'VOLU','ME E','GOUT','VOLU','ME U','SINE',
1,  DBU,  ,  ,  A,  'UTRE',  ,  ,  MS,  ,  ,  DI,  'U
2ERS,/
DO 1 J=10,15
1  PVAUM(J)=PVAUY(J)*100.0
2  PVAUN(J)=PVAUX(J)*100.0
3  P3XFR0(J)=P3XFR(J)*100.0
1  CONTINUE
1  PVAIM=PVAIX*100.0
2  PVAIN=PVAIX*100.0
30  P2XFR0=P2XFR*100.0
4  PVAUM=PVAUX*100.0
5  PVAUN=PVAUX*100.0
35  PT3XFR0=PT3XFR*100.0
6  PVTAM=PVTAY*100.0
7  PVTAN=PVTAX*100.0
8  PTAXFR0=PTAXFR*100.0
9  PVOEM=PVOEX*100.0
40  PVOEN=PVOEX*100.0
1  P5XFR0=P5XFR*100.0
2  PVOIM=PVOIY*100.0
3  PVOIN=PVOIX*100.0
4  PVOUM=PVOUY*100.0
5  PVOUN=PVOUX*100.0
45  P6XFR0=P6XFR*100.0
6  PVTOM=PVTOT*100.0
7  PVTON=PVTOT*100.0
8  PTOXFR0=PTOXFR*100.0
9  PVTM=PVTY*100.0
50  PVTN=PVTX*100.0
1  PTXFR0=PTXFR*100.0
WRITE(6,10)
10 FORMAT('1',50X,'RESULTATS')
11 WRITE(6,11)
11 FORMAT('//////5X','ALLOCATION DES COUTS USAGER-PROPRIETE-USAGE FUTUR
+ RESERVE')
12 WRITE(6,12)
12 FORMAT('///54X','PROPRIETE USAGER USAGE FUTUR RESERVE')

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60      WRITE(6,13)
13      FORMAT(30X,"COUTS D AMORTISSEMENT")
      WRITE(6,14)
14      FORMAT(35X,"RESEAU",11X,"100.0",10X,"-----")
      WRITE(6,15) PVAIM,PVAIN,P2XFRO
15      FORMAT(35X,"INTERCEPTEUR",7X,F8.1,F10.1,10X,F5.1)
      WRITE(6,16) PVAUM(10),PVAUN(10),P3XFRO(10)
16      FORMAT(35X,"USINE: VOLUME EGOUT",F8.1,F10.1,10X,F5.1)
      DO 17 J=11,14
      JK=J-9
      WRITE(6,18) (SAGE2(K,JK),K=1,3),PVAUM(J),P3XFRO(J)
17      CONTINUE
18      FORMAT(42X,3A4,F8.1,F10.1,10X,F5.1)
      WRITE(6,19) PVTAM,PVTAN,PT3XFO
      WRITE(6,20) PVTAM,PVTAN,PT3XFO
      WRITE(6,20) PVTAM,PVTAN,PT3XFO
19      FORMAT(48X,"DIVERS",F8.1,F10.1,10X,F5.1)
20      FORMAT(30X,"% GLOBAL D AMORTISSEMENT",F8.1,F10.1,10X,F5.1)
40      FORMAT(42X,"GLOBAL USINE",F8.1,F10.1,10X,F5.1)
      WRITE(6,30)
30      FORMAT(/,30X,"COUTS D OPERATION")
      WRITE(6,31) PVDIM,PVDEN
31      FORMAT(35X,"RESEAU",8X,F8.1,F10.1,10X,"-----")
      WRITE(6,32) PVDIM,PVDIN,P5XFO
32      FORMAT(35X,"INTERCEPTEUR",7X,F8.1,F10.1,10X,F5.1)
      WRITE(6,33) PVDUM,PVDUN,P6XFO
33      FORMAT(35X,"USINE: VOLUME USINE",F8.1,F10.1,10X,F5.1)
      DO 34 JK=3,5
      WRITE(6,35) (SAGE2(K,JK),K=1,3),PVDUM,PVDUN,P6XFO
34      CONTINUE
35      FORMAT(42X,3A4,F8.1,F10.1,10X,F5.1)
      WRITE(6,36) PVTOM,PVTON,PTOXFO
36      FORMAT(48X,"DIVERS",F8.1,F10.1,10X,F5.1)
      WRITE(6,37) PVTOM,PVTON,PTOXFO
37      FORMAT(30X,"% GLOBAL D OPERATION",4X,F8.1,F10.1,10X,F5.1)
      WRITE(6,38) PVTM,PVTN,PTXFO
38      FORMAT(/,30X,"% GLOBAL",16X,F8.1,F10.1,10X,F5.1)
      RETURN
      END

```



```

1  SUBROUTINE IMPR3
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VRU(15),VOU(15),WH(20),
1  VAE,VAI,VAU,VOE,VOI,VZ,PVOEX,PVOIY,PVOUY,POINTE,
2  PVOU(15),VTOU,RAU(5),LSTOP,LFGM,CFR(15),QF2,
3  CF2(3),LQC
5  COMMON/CAL/PQFU(5),PQFE(5),PQA(5),PVRU(15),
1  QTAI,QTFU,QTFE,VTBU,VTO,VTA,VT,QTau
10 COMMON/ALL/MTA(15),WTF(15),PVAUX(15),PVAUY(15),
1  PVAIX,PVAIX,PVOEX,PVOIX,PVOUX,
2  P3M(15),P3MR(15),P3NR(15),
3  P3M,P1MR,P1MC,P2M,P2MR,P2MC,P2NR,P2NC,P4M,P4MR,P4MC
4  P5N,P5NR,P5NC,P6N,P6NR,P6NC,P2XFR,WFR(15),P3XFR(15),P5XFR,P6XFR
COMMON/COU/VAU(15),VAX(15),VOU(15),VOUX(15),
1  VAEY,VAIY,VAIX,PVTAUY,PVTAX,PVTX,PVTY,
2  PUTOY,PVTOX,PVTAY,PVTAX,PVTX,PVTY,
3  V3M(15),V3MR(15),V3NR(15),
4  P3MT,P3NT,P3MRT,P3MCT,P3NRT,P3NCT,V6N,V6NR,V6NC
5  V2XFR,V3XFR(15),PT3XFR,V5XFR,V6XFR(15),
6  PTOXFR,PTAXFR,PTXFR
20 COMMON/TAR/PUXO(15),VOX(15),PVAX(15),VAX(15),PVZX(15),VZX(15),
1  PVGX(15),VGX(15),
2  POMRT,POMCT,PONRT,PONCT,
3  VOMRT,VOMCT,VONRT,VONCT,VTOY,VTOX,
4  FAMRT,FAMCT,PANRT,PANCT,
5  VAMRT,VAMCT,VANRT,VANCT,VTAI,VTAI,VTAX,
6  PZMR,PZMC,PZNR,PZNC,PVIZY,PVIZX,
7  VZMR,VZMC,VZNR,VZNC,VIZY,VIZX,
8  PTMR,PTMC,PTNR,PTNC,
9  VTMR,VTMC,VTNR,VTNC,VTY,VTX
30 1,VAXFR(15),VOXFR(15),POXFR(15),PAXFR(15),VTOXFR,VTAXFR,VTXFR
2,PTZFR,VZFR(15),PZFR(15),VGXFR(15),PGXFR(15),VTXFR
DIMENSION SAGE3(3,4),PUXK(15),PVAXK(15),PVZK(15),PVGXK(15)
4,POXFK(15),PAXFK(15),PZFK(15),PGXFK(15)
DATA SAGE3/'VOLUME',ME,'',DBO,'',AUR,'',E
35 1,'',MS,'',
DO 1 J=1,15
PVXK(J)=PUXO(J)*100.0
PVAXK(J)=PVAX(J)*100.0
PVZK(J)=PVZ(J)*100.0
PVGXK(J)=PVGX(J)*100.0
POXFK(J)=POXFR(J)*100.0
PAXFK(J)=PAXFR(J)*100.0
PZFK(J)=PZFR(J)*100.0
PGXFK(J)=PGXFR(J)*100.0
45 1 CONTINUE
FAMRTK=FAMRT*100.0
FAMCTK=FAMCT*100.0
PANRTK=PANRT*100.0
PANCTK=PANCT*100.0
PVTOKK=PVTOK*100.0
PVTOKY=PVTOK*100.0
PVTOKK=PVTOK*100.0
PVTAXK=PVTAX*100.0
PVTAYK=PVTAY*100.0
PTAXFK=PTAXFR*100.0
PVTZK=PVTZ*100.0
PVTZYK=PVTZY*100.0

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```

100 P1ZXFK=PTZXFR*100.
    PUTXK=PUTX*100.0
    PUTYK=PUTY*100.0
    PTXFK=PTXFR*100.
    POMRTK=POMRT*100.0
    POMCTK=POMCT*100.0
    PONRTK=PONRT*100.0
    PONCTK=PONCT*100.0
    PZMRK=PZMR*100.0
    PZMCK=PZMC*100.0
    PZNRK=PZNR*100.0
    PZNCK=PZNC*100.0
    PTMRK=PTMR*100.0
    PTMCK=PTMC*100.0
    PTNRK=PTNR*100.0
    PTNCK=PTNC*100.0
    WRITE(6,10)
10 FORMAT('1',///,5X,'DISTRIBUTION DES DEPENSES ANNUELLES',//)
11 WRITE(6,11)
11 FORMAT(33X,'X')
12 WRITE(6,12)
12 FORMAT(33X,'X','ENTRETIEN-OPERATION AMORTISSEMENT AMELIOR
1ATIONS
DEPENSES ANNUELLES')
13 WRITE(6,13)
13 FORMAT(33X,'X',4X,'%','12X,$',6X,'%','12X,$',12X,'$',6X,
1'Z','12X,$')
    WRITE(6,11)
    WRITE(6,14)
14 FORMAT(10X,105('X'))
    WRITE(6,21)
21 FORMAT(10X,'PROPRIETE',14X,'X')
    WRITE(6,22) POMRTK,VOMRT,PAMRTK,VAMRT,PZMRK ,VZMR,PTMRK,UTMR
    WRITE(6,23) POMCTK,VOMCT,PAMCTK,VAMCT,PZMCK ,VZMC,PTMCK,UTMC
    WRITE(6,24) PONRTK,VONRT,PANRTK,VANRT,PZNRK ,VZNR,PTNRK,VTNR
    WRITE(6,25) PONCTK,VONCT,PANCTK,VANCT,PZNCK ,VZNC,PTNCK,VTNC
    FORMAT(13X,'USAGERS-R X',4(F6.1,F12.2,2X))
22
23 FORMAT(13X,'USAGERS-C X',4(F6.1,F12.2,2X))
24 FORMAT(13X,'NON-USAGERS-R X',4(F6.1,F12.2,2X))
25 FORMAT(13X,'NON-USAGERS-C X',4(F6.1,F12.2,2X))
    WRITE(6,11)
15 PUTYK,UTOY,PUTAYK,UTAY,PUTZYK,UTZY,PUTYK,UTY
15 FORMAT(13X,'SOUS-TOTAL',10X,'X',1X,4(F6.1,F12.2,2X))
    WRITE(6,11)
30 WRITE(6,30)
30 FORMAT(10X,'USAGE FUTUR RESERVE',4X,'X')
    DO 31 I=11,14
    J=I-10
105 WRITE(6,18) (SAGE3(K,J),K=1,3),POXFK(I),VOXFR(I),PAXFK(I),VAXFR(I
+),PZXFK(I),VZXFR(I),PGXFK(I),VGXFR(I)
31 CONTINUE
    WRITE(6,11)
    WRITE(6,15) P10XFK,V10XFR,PTAXFK,VTAXFR,PTZXFK,VTZXFR,PTXFK,VTXFR
    WRITE(6,11)
    WRITE(6,16)
16 FORMAT(10X,'USAGERS',16X,'X')
    DO 17 I=11,14
    J=I-10

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```

115 WRITE(6,18) (SAGE3(K,J),K=1,3),PVXOK(I),VOX(I),PVAXK(I),VAX(I)
1,PVZXK(I),VZX(I),PVGKK(I),VGX(I)
17 CONTINUE
18 FORMAT (13X,3A4," X ",4(F6,1,F12,2,2X))
120 WRITE(6,11)
WRITE(6,19) PVTOXK,UTOX,PVTAXK,VTAX,PVTZXK,VTZX,PVTXK,VTX
19 FORMAT (13X,"SOUS-TOTAL X ",4(F6,1,F12,2,2X))
WRITE(6,11)
WRITE(6,11)
WRITE(6,11)
125 WRITE(6,20) VTD,UTA,VZ,VT
WRITE(6,20) VTD,UTA,VZ,VT
20 FORMAT (10X,"TOTAL",18X,"X 100.0",F12,2," 100.0",F12,2,
1 100.0",F12,2," 100.0",F12,2)
WRITE(6,11)
RETURN
END

```

```

1  SUBROUTINE AJUST (QMAS,CMS,FL,M1,M2,M3,CS)
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VRU(15),VQU(15),WH(20),
2  VAE,VAI,VAU,VOE,VOI,VZ,PVDEY,PVOIY,PVOUY,POINTE,
3  PVOU(15),VTOU,QAU(5),LSTOP,LFGM,CFR(15),QF2,
4  CF2(3),LQC
5  DIMENSION FL(5),CS(5,15),CMS(3)
C  CALCUL DE LA QUALITE DE L'EAU RESIDUELLE
DO 1 J=1,3
  JK=1+J
  XQ=0.0
  DO 2 M=M1,M2
    XQ=XQ+FL(M)*CS(M,JK)
  2 CONTINUE
  C(M3,JK)=(QMAS*CMS(J)-XQ)/FL(M3)
  1 CONTINUE
  RETURN
END

```



```

1      SUBROUTINE LIEN
C
C      RELIE L'INFORMATION CALCULEE DANS LA PARTIE DU PROGRAMME PAR
C      TAGEANT LES TARIFS
C      A CELLE EMETTANT LES FACTURES, PAR LE BIAIS DE CHANGEME
C      NTS DE VARIABLES.
C
10     COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VBU(15),WH(20),
1      VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2      PVOU(15),VTOU,QAU(5),LSTOP,LPGM,CFR(15),QF2,
3      CF2(3),LOC
C
15     COMMON/TAR/PVXO(15),VOX(15),PVAX(15),VAX(15),PVZX(15),VZX(15),
1      FVGX(15),VGX(15),
2      POMRT,POMCT,PONRT,PONCT,
3      VOMRT,VOMCT,VONRT,VONCT,VTOY,UTOX,
4      PAMRT,PAMCT,PANRT,PANCT,
5      VAMRT,VAMCT,VANRT,VANCT,VTAY,VTAX,
6      PZMR,PZMC,PZNR,PZNC,PVTZY,PVTZX,
7      VZMR,VZMC,VZNR,VZNC,VTZY,VTZX,
8      PTMR,PTMC,PTNR,PTNC,
9      VTMR,VTMC,VTNR,VTNC,VTY,VTX
20     1,VAXFR(15),VOXFR(15),POXFR(15),PAXFR(15),VTOXFR,VTAXFR,VTZXFR
2      PTZXFR,VZXFR(15),PZXFR(15),VGXFR(15),PGXFR(15),VTXFR
C
25     COMMON/DAT1/C1(3),C9(3),QA1,QA2,Y(14),C6(3)
C
30     Y(1)=VTMR
3      Y(2)=VTMC
4      Y(3)=VTNR
5      Y(4)=VTNC
6      DO 2 I=5,8
7      2 Y(I)=VGX(I+6)
8      DO 3 I=11,14
9      3 Y(I)=VGXFR(I)
10     QA1=QAI(1)
11     QA2=QAI(2)
12     DO 4 I=1,3
13     4 J=I+11
14     C1(I)=C(1,J)
15     C9(I)=C(2,J)
16     C6(I)=CFR(J)
17     4 RETURN
18     END

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1      SUBROUTINE SUMM
      CALCUL DES COUTS UNITAIRES
      COMMON/DAT/QA1(5),QF6(6),QFE(6),C(5,15),VBU(15),VOU(15),WH(20),
1      VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2      PVDU(15),VTDU,QAU(5),LSTOP,LFGM,CFR(15),QF2,
3      CF2(3),LOC
      COMMON/DAT1/C1(3),C9(3),QA1,QA2,Y(14),C6(3)
      COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1      SJ,FI,SI,Q2,C2(3),UI,
2      MC,MEC,MJ,MEJ,MEI,NH
4      IFR,SR,MR,NORO,NOROJ
      COMMON/DUM/NC,NJ,NI,L2,L3,LIP,LYN
      COMMON/SOM/XFACT,XU,FI,FT2,ST1,ST2,XF1,XF2,HT,YV,YC(3),YU,YF1,YF2
4      YF1J,YF1J,FT1J,ST1J
15     YS1,YS2,YFACT,YH,XE1,XE2,XIU,YV6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
      INITIALISATION
      YU=0.0
      YF1=0.0
      YF1J=0.0
      YF2=0.0
      YS1=0.0
      YS1J=0.0
      YS2=0.0
      YH=0.0
      YFACT=0.0
      UI=0.0
      XIU=0.0
      YV6=0.0
      DO 9 I=1,3
      YC6(I)=0.0
      YC(I)=0.0
9      CONTINUE
      XFACT=XFACT+NI+NJ
      VT=(QA1+QA2)*365.0
      DO 40 J=1,3
      WT(J)=(QA1*CI(J)+QA2*CI9(J))*0.365
40     CONTINUE
      CALCUL DES COUTS UNITAIRES
      COUTS PAR UNITE DE VOLUME INDUSTRIEL FUTUR RESERVE
      X=VIF-VI
      IF (X.LT.0.01) GOTO 52
      YV6=Y(11)/X*1000.
      COUTS PAR UNITE DE CONCENTRATION INDUSTRIELLE FUTURE RESERVEE
52     DO 51 J=1,3
      X=WFR(J)-WI(J)
      PETIT=-0.001
      GRAND=0.001
      IF (X.LT.GRAND.AND.X.GT.PETIT) GOTO 51
      YC6(J)=Y(J+11)/X*1000.
51     CONTINUE
      COUTS PAR UNITE DE VOLUME (USAGER INDUSTRIEL)
      YV=Y(5)/VT*1000.0

```



```

C      COUTS PAR UNITE DE CONCENTRATION (USAGER INDUSTRIEL)
DO 50 J=1,3
IF (WT(J).LT.0.01) GOTO 50
YC(J)=Y(J+5)/WT(J)*1000.0
50 CONTINUE
C      COUT PAR UNITE DE LOGEMENT (USAGER DOMESTIQUE OU COMMERCIAL)
X=0.0
DO 60 J=1,3
X=X+(Y(J+5)-YC(J))*WI(J)/1000.0
60 CONTINUE
IF (XU.LT.0.01) GOTO 70
YU=((Y(5)-YU*UI/1000.0)+X)/XU
C      COUT PAR UNITE D'EVALUATION FONCIERE (PROPRIETE-USAGER-C)
70 IF (FT1.LT.0.01) GOTO 80
YF1=Y(2)/FT1*1000.0
C      COUT PAR UNITE D'EVALUATION FONCIERE (PROPRIETE-N-USAGER-C)
80 IF (FT2.LT.0.01) GOTO 90
YF2=Y(4)/FT2*1000.0
C      COUT PAR UNITE DE SUPERFICIE DE RUISSELLEMENT (PROPRIETE-USAGER-R)
90 IF (ST1.LT.0.01) GOTO 100
YS1=Y(1)/ST1*100.0
C      COUT PAR UNITE DE SUPERFICIE DE RUISSELLEMENT (PROPRIETE N-USAGER-R)
100 IF (ST2.LT.0.01) GOTO 110
YS2=Y(3)/ST2*100.0
110 IF (HT.LT.0.01) GOTO 120
YH=Y(10)/HT
C      COUT D'ECHANTILLONNAGE UNITAIRE
YH=Y(10)/HT
C      COUT DE FACTURATION UNITAIRE
120 YFACT=Y(9)/XFACT
C      COUTS AUX USAGERS DOMESTIQUES
RLYN=LYN-1
IF (FT1J .GE. 0.01) YF1J=YF1+RLYN*Y(4)/FT1J*1000.0
IF (ST1J .GE. 0.01) YS1J=YS1+RLYN*Y(3)/ST1J*100.0
RLYN=2-LYN
YF2=YF2*RLYN
YS2=YS2*RLYN
RETURN
END

```



```

1      SUBROUTINE IMPRSU
C
C      IMPRESSION DES RESULTATS
C
5      COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VOU(15),WH(20),
        VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,PPOINTE,
        PVOU(15),VTOU,RAU(5),LSTOP,LPGM,CFR(15),QF2,
        CF2(3),LOC
10     COMMON/DAT1/C1(3),C3(3),QA1,QA2,Y(14),C6(3)
        COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1      SJ,FI,SI,Q2,C2(3),UI,
        MC,MEC,NJ,MEJ,MEI,NH
        +,IFR,SR,MER,NORO,NOROJ
        COMMON/DUMM/NC,NJ,L2,L3,LIP,LYN
15     COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YV,YC(3),YU,YF1,YF2
        +,YF1J,YS1J,FT1J,ST1J
1      YS1,YS2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
C
C      CALCULS PRELIMINAIRES
C
        QUNIT=0.4
        QUNITK=QUNIT*1000.0
        NCJ=XFACT-NI
        NFACT=XFACT
        FTT=FT1+FT2
        STI=ST1+ST2
        XIU=QA1/(QUNIT*XU)
C
        NF1=XF1
        NF2=XF2
        NE1=XE1
        NE2=XE2
        NU=XU
        WRITE(6,1) (WH(I),I=1,18)
1      FORMAT (1,/,/,1X,18A4,/)
        WRITE(6,2)
2      FORMAT (5X,"PROFIL DES CONTRIBUABLES", / ,5X,24("=",),/)
        WRITE(6,3) NI
3      FORMAT (30X,I7," INDUSTRIES")
        WRITE(6,4) NCJ
4      FORMAT (30X,I7," CONTRIBUABLES DOMESTIQUES OU COMMERCIAUX")
        WRITE(6,5) NFACT
C
5      FORMAT (30X,"=====", / ,30X,I7," CONTRIBUABLES",/)
C
        WRITE(6,6) NF1
6      FORMAT (30X,I7," CONTRIBUABLES USAGERS")
        WRITE (6,7) NF2
7      FORMAT (30X,I7," CONTRIBUABLES NON-USAGERS")
        WRITE (6,5) NFACT
C
        WRITE(6,8) NE2
8      FORMAT (30X,I7," CONTRIBUABLES,USAGERS OU NON-USAGERS,DESSERVIS PA
1R UN RESEAU DOMESTIQUE")
        WRITE (6,9) NE1
9      FORMAT (30X,I7," CONTRIBUABLES,USAGERS OU NON-USAGERS,DESSERVIS PA
1R UN RESEAU UNITAIRE")

```

```

C
60      WRITE (6,5) NFACT
      WRITE (6,10)
10     FORMAT (/ ,5X, "CRITERES DE FACTURATION", / ,5X,23('='),//)
      WRITE (6,11)
11     FORMAT (10X, "EVALUATION FONCIERE",//)
      WRITE (6,12) F11
12     FORMAT (30X,F15.2," $ PROPRIETES- USAGERS")
      WRITE (6,13) F12
13     FORMAT (30X,F15.2," $ PROPRIETES-NON-USAGERS")
      WRITE (6,14) F11
14     FORMAT (30X,15('='), / ,30X,F15.2," $ TOTAL")
      WRITE (6,40)
40     FORMAT (/ ,10X, "SUPERFICIE DRAINEE",//)
      WRITE (6,41) ST1
41     FORMAT (25X,F15.2," M2 PROPRIETES USAGERS")
      WRITE (6,42) ST2
42     FORMAT (30X,F10.2," M2 PROPRIETES NON-USAGERS")
      WRITE (6,43) STT
43     FORMAT (30X,10('='), / ,25X,F15.2," M2 TOTAL")
      WRITE (6,44)
44     FORMAT (/ ,10X, "UNITES DE LOGEMENT",//)
      WRITE (6,45) NU
45     FORMAT (30X,16," UNITES DE LOGEMENT(DOMESTIQUES ET COMMERCIALES)"
1)
      WRITE (6,46) QAI
46     FORMAT (/ ,30X,"DEBIT DOMESTIQUE TOTAL=",F9.1," M3/JOUR")
      WRITE (6,47) NU
47     FORMAT (34X,"UNITES DE LOGEMENT=",I9)
      WRITE (6,48) QUNITK
48     FORMAT (30X,"HYPOTHESE SUR LE REJET:",F8.1," LITRES/PERS-JOUR")
      WRITE (6,49) XIU
49     FORMAT (/ ,30X,"NOMBRE DE PERSONNES/UNITE DE LOGEMENT=",F4.1)
      WRITE (6,15)
15     FORMAT (/ ,1,/// ,5X,"COUTS UNITAIRES", / ,5X,15('='),//)
      WRITE (6,16) YU
16     FORMAT (10X,"CONTRIBUTIBLES INDUSTRIELS: $/1000 M3=",F6.2)
      WRITE (6,17) YC(1)
17     FORMAT (38X,"$/1000 KG DE DBO=",F6.2)
      IF (YC(2).GT.0.01) WRITE (6,18) YC(2)
18     FORMAT (38X,"$/1000 KG DE 'AUTRE'=",F7.2)
      WRITE (6,19) YC(3)
19     FORMAT (38X,"$/1000 KG DE MS=",F6.2)
      WRITE (6,20) YH
20     FORMAT (38X,"$/UNITE D'ECHANTILLONNAGE=",F6.2)
      IF (LYN.EQ.1) GO TO 30
      WRITE (6,101) YF1
101    FORMAT (38X,"$/1000 D"EV. FONC.=",F6.2)
      WRITE (6,23) YS1
30     CONTINUE
      WRITE (6,100) YU6
100    FORMAT (/ ,10X,"USAGE INDUSTRIEL FUTUR : $/1000 M3=",F6.2)
      WRITE (6,17) YC6(1)
      IF (YC6(2).GT.0.01) WRITE (6,18) YC6(2)
      WRITE (6,19) YC6(3)
      WRITE (6,21) YF1J
21     FORMAT (/ ,10X,"CONTRIBUTIBLES USAGERS",7X,"$/1000 D"EV. FONC.=",F7

```



```
115      1,3)
      WRITE (6,22) YU
      22 FORMAT(38X,"$/UNITE DE LOGEMENT=",F6.2)
      WRITE (6,23) YS1J
      23 FORMAT(38X,"$/100 M2 DRAINE=",F6.2)
      120      WRITE (6,24) YF2
      24 FORMAT(/,10X,"CONTRIBUABLES NON-USAGERS",F6.2)
      1F6.2)
      WRITE(6,25) YS2
      25 FORMAT(38X,"$/100 M2 DRAINE=",F6.2)
      WRITE (6,26) YFACT
      26 FORMAT(/,10X,"TOUS LES CONTRIBUABLES",6X,"$/FACTURE=",F6.2)
      RETURN
      END
```



```

1  SUBROUTINE IMPRF(I,NCART)
COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
2  SJ,FI,SI,Q2,C2(3),UI,
3  MC,MEC,MJ,MEJ,MEI,NH
5  +,IFR,SR,MR,NORO,NOROU
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
+ ,YF1J,YF1J,FT1J,ST1J
10 1,YF1,YF2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WFR(3),VI,VIF
COMMON/CON/M,ME,U,F,S,YTC,YTJ,YTI,
1YPU,YPR,YU,YUD,YUG(3),YUH,YPU1,YPR1,YPRF,YUDF,YUQF(3),YTIF
DIMENSION MESS1(3,2),MESS2(3,2)
DATA MESS1/' U','SAGE','RS ','NON','USA','GERS'/'
DATA MESS2/' UN','ITALI','RE ','DOM','ESTI','QUE'/'
15 C
C
C IMPRESSION DES FACTURES DES CONTRIBUABLES PAR CATEGORIE
IF (LIP-NCART .LT. 23) WRITE(8,8)
8 FORMAT(1H1)
IF (LIP-NCART .LT. 23) NCART=0
NCART=NCART+23
NJC=XJC
WRITE (8,10) I,
+ NJC,(MESS1(K,M),K=1,3),(MESS2(K,ME),K=1,3),
+ YPU1,F,YPU
25 IF (ME .EQ. 1) WRITE(8,15)YPR1,S,YPR
IF (ME .EQ. 2) WRITE(8,16)S
WRITE (8,20) YU,U,YUU,
+ YFACT,YUF,
+ YTC
30 C
10 FORMAT ('..',CATEGORIE,I4,/,
+ '0',I7,' CONTRIBUABLES',3A4,/,
+ '...',3X,'D E S C R I P T I O N',24X,'C O U T U N I T A I
+ R E',20X,4X,'QUANTITE',10X,6X,'COUT',/,
+ '...',3X,'PROPRIETE E A U X U S E S',12X,'$',F8.2,
+ '$1000 EVALUATION FONCIERE',10X,'$',F11,2,10X,'$',F9.2)
15 FORMAT ('...',3X,14X,'EAUX DE RUISSELLEMENT',10X,'$',F8.2,
+ 'DE SUPERFICIE',15X,F12.2,' M2',7X,'$',F9.2,/)
16 FORMAT ('...',3X,14X,'EAUX DE RUISSELLEMENT',10X,9(' '),'/100 M2
+ SUPERFICIE',15X,F12.2,' M2',7X,6X,4(' '),/)
20 FORMAT ('...',3X,'USAGE E A U X U S E S',12X,'$',F8.2,
+ '/UNITE DE LOGEMENT',18X,F12.2,10X,'$',F9.2,/,
+ '...',3X,14X,'F A C T U R A T I O N',10X,'$',F8.2, /FACTURE
+ '$',28X,22X,'$',F9.2,/,
+ '...',3X,38X,46X,29X,10(' '),/,
+ '0',3X,'TOTAL',33X,46X,29X,'$',F9.2,/,
+ '...',126(' '),)
RETURN
END
50

```

```

1  SUBROUTINE IMPRB (TC,TJ,II,TIF)
COMMON/DAT1/C1(3),C9(3),QA1,QA2,Y(14),C6(3)
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
5  DIMENSION MESS4 (4,10)
DATA MESS4/'USAG','ERS-','R','','USAG','ERS-','C','VOLU'
1,'NON-','USAG','ERS-','R','NON-','USAG','ERS-','C','VOLU'
2,'ME','','USAG','ERS-','R','NON-','USAG','ERS-','C','VOLU'
3,'','USAG','ERS-','R','NON-','USAG','ERS-','C','VOLU'
4,'','USAG','ERS-','R','NON-','USAG','ERS-','C','VOLU'
C
10 Y(5)=Y(5)+Y(11)
Y(6)=Y(6)+Y(12)
Y(7)=Y(7)+Y(13)
Y(8)=Y(8)+Y(14)
15 TET1=0.0
DO 1 I=1,10
TET1=TET1+Y(I)
1 CONTINUE
TE=TC+TJ
TET2=TE+II+TIF
TIR=II+TIF
25 WRITE (6,2)
2 FORMAT ('1',///,6X,'BILAN DES DEFENSES PAR POSTE ET DE LA SOMMATIO'
1N DES FACTURES',/,6X,60('='))
WRITE (6,3)
3 FORMAT (///,6X,'DEPENSES PAR POSTE',/)
DO 5 I=1,10
WRITE (6,4) (MESS4(K,I),K=1,4),Y(I)
5 CONTINUE
4 FORMAT (9X,4A4,F12.2)
WRITE (6,6) TET1
6 FORMAT (25X,12('='),/,25X,F12.2)
WRITE (6,7)
7 FORMAT (///,6X,'REVENUS',/)
WRITE (6,8) TE
8 FORMAT (9X,'CONTRIBUTIBLES DOMESTIQUES ET COMMERCIAUX',F12.2)
9 FORMAT (6,9) TIR
WRITE (6,9) TIR
10 FORMAT (49X,12('='),/,49X,F12.2)
IF (LYN.EQ. 2) WRITE(6,11)
11 FORMAT ('-LES DEFENSES ATTRIBUABLES AUX NON-USAGERS ONT ETE REPORTE'
+ES AUX USAGERS DOMESTIQUES ACTUELS.')
RETURN
END
45

```



```

1  SUBROUTINE TABLE(I,NCART,LIP)
COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1  SJ,FI,SI,Q2,C2(3),UI,
2  MC,MEC,MJ,MEJ,MEI,NH
5  +,IFR,SR,MER,NORO,NOROJ
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
+YF1J,YF1J,FT1J,ST1J
1  +YS1,YS2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
COMMON/CON/M,ME,U,F,S,YTC,YTJ,YTI,
1YPU,YPR,YUU,YUF,YUD,YUQ(3),YUH,YPU1,YPR1,YPRF,YUDF,YUQF(3),YTIF
10 DIMENSION MESS1(3,2),MESS2(3,2)
DIMENSION ALPHA(2)
DATA MESS1/'USAG','ER ','NON-','USAG','ER '/
DATA MESS2/'UNIT','AIRE','DOME','STIQ','UE '/
15 IF (I-NCART) 10,10,9
9 NCART=NCART+(LIP-4)/2
C
C IMPRESSION DE LA CARTOUCHE
C
20 WRITE (9,100)
100 FORMAT ('1,/,1X,<','16('-'),PROFIL DU CONTRIBUABLE',16('-'),>','
+3X,<','23('-'),'FACTURE',23('-'),>')
WRITE (9,101)
101 FORMAT(3X,'TYPE DE TYPE DE UNITES DE EVALUATION SUPERFICIE
+ COUTS A LA PROPRIETE',8X,'COUTS USAGER TOTAL CONTRIB
+UABLE')
WRITE (9,102)
102 FORMAT(1X,'CONTRIBUABLE RESEAU LOGEMENT FONCIERE (M2)
+ EAUX USEES EAUX RUISS. EAUX USEES FACTURE',/)
30 10 WRITE(9,103) (MESS1(K,M),K=1,3),(MESS2(K,ME),K=1,3),U
+,F,S,YPU,YPR,YUU,YUF,YTJ,NOROJ
C
103 FORMAT(/,1X,3A4,1X,3A4,F6.2,3X,F10.2,F12.2,6X,F8.2,5X,F8.2,5X
+,
+f8.2,3X,F5.2,3X,F8.2,4X,1A9)
RETURN
END
35

```



```

1 SUBROUTINE TABLI(LIP,LIGNE)
3
5 IMPRESSION DU TABLEAU DES FACTURES INDUSTRIELLES
3
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VBU(15),WH(20),
1 VAE,VAI,VAU,VOE,VOI,VZ,PVOEY,PVOIY,PVOUY,POINTE,
2 PVOU(15),VTOU,QAU(5),LSTOP,LPGM,CFR(15),QF2,
3 CF2(3),LQC
COMMON/DAT2/XJC,JC,FC,SC,UJ,FJ,
1 SJ,FI,SI,Q2,C2(3),UI,
2 MC,MEC,MJ,MEJ,MEI,NH
3
+ IFR,SR,MER,NORO,NOROJ
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
+ ,YF1J,YF1J,FT1J,ST1J
1 YS1,YS2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
2 COMMON/CON/M,ME,U,F,S,YTC,YTJ,YTI,
3 YPU,YPR,YUU,YUF,YUD,YUQ(3),YUH,YPU1,YPR1,YPRF,YUDF,YUQF(3),YTIIF
DIMENSION MESS2(3,2)
DATA MESS2/'UNIT','AIRE','', 'DOME','STIQ','UE' //
IF ((LIGNE.NE.0).AND.(LIGNE.LT.LIP)) GOTO 1
2 LIGNE=0.0
WRITE(7,3) YFACT
3 FORMAT('1','PROFIL
+ ',
+ 'D,B.O. AUTRE M.S. ECHANTIL. FACTURE SOUS-TOTAL TOTAL CO
+ NT',
+ 'RIBUABLE',/,11X,'RESEAU',6X,'FONCIERE($)' (M2)',8X,'(M3/J)' ,
+ '(MG/L)' (MG/L)' ,22X,'($)',8X,'($)',/,1X,'COUTS'
+ ,/,1X,'UNITAIRES',15X,'$/1000$' $/100M2 $/1000M3 $/1000KG ,
+ $/1000KG $/1000KG $/UNITE $,F5,2)
WRITE(7,4) YF1,YS1,YU,YC,YH,YS2,YU6,YC6
4 FORMAT(1X,'US,ACTUEL',16X,F5,3,6X,F5,2,5X,F6,2,4X,F6,2,3X,F7,2
+ ,3X,F6,2,2X,F6,2,/,1X,'US,FUTUR',16X,'-----',7X,F5,2,5X,F6,2,
+ ,4X,F6,2,4X,F6,2,3X,F6,2,3X,'-----',////)
LIGNE=LIGNE+10
35
C IMPRESSION DES FACTURES
C
1 WRITE(7,5) NORO,(MESS2(J,ME),J=1,3),F,F,S
+ ,Q2,(C2(1),I=1,3),NH
5 FORMAT(1X,'FACTURE',112(' '),/1X,'US,ACTUEL',/,1X,'PROFIL
+ ',
+ ,3A4,F10,2,1X,F10,1,1X,F9,1,3X,F7,1,3X,F7,1,4X,F6,1,6X,I2)
WRITE(7,6) YPU,YPR,YUD,YUQ,YUH,YFACT,YTI
6 FORMAT(1X,'COUT',19X,F9,2,3X,F9,2,1X,F9,2,1X,F9,2,2X,F8,2,
+ ,1X,F7,2,2X,F5,2,2X,F10,2,13X,'ACTUEL',/)
LIGNE=LIGNE+5
IF (IFR.NE.1) TOT=YTI
9 FORMAT(110X,F12,2,' TOTAL',////)
IF (IFR) 10,10,11
10 WRITE(7,9) TOT
LIGNE=LIGNE+4
RETURN
11 WRITE(7,7) (MESS2(J,MER),J=1,3),SR,QF2,(CF2(I),I=1,3)
7 FORMAT(1X,'US,FUTUR',/,1X,'PROFIL
+ ,1X,F9,1,3X,F7,1,3X,F7,1,4X,F6,1,6X,'-----',3X,F10,1,
LIGNE=LIGNE+7
55

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```
60      TOT=YII+YTIF
        WRITE(7,8) YPRF,YUOF,YURF,YTIF
        WRITE(7,9) TOT
        8  FORMAT(1X,'COUT',20X,'-----',5X,F9.2,1X,F9.2,2X,F8.2,2X,F8.2,3X
          +,F7.2,5X,'---',4X,'-----',1X,F10.2,13X,'FUTUR')
        RETURN
        END
```



```

1 SUBROUTINE LECTI
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VBU(15),WH(20),
1 VAE,VAI,VAU,VOE,VOL,VZ,FVDEY,FVOLI,FVOLI,FVOLI,FVOLI,FVOLI,FVOLI,
2 FVOLI(15),VTOU,RAU(5),LSTOP,LPGM,CFR(15),QF2,
3 CF2(3),LQC
COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1 SJ,FI,SI,Q2,C2(3),UI,
2 MC,MEC,MJ,MEJ,MEI,NH
+ ,IFR,SR,MER,NOROJ
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
+ ,YF1J,YF1J,FT1J,ST1J
1 ,YS1,YS2,YFACT,YH,XE1,XE2,XIU,YV6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
COMMON/DUMM/NC,NJ,NI,L2,L3,LIF,LYN
COMMON/CONV/CONVT(3),CONVT2(3)
UNIT(Q,L1)=Q*CONVT(L1)
UNIT2(S,L4)=S*CONVT2(L4)
NI=0.
IF (LQC .NE. 1) QFU(6)=0.0
10 READ(2,100)Q2,(C2(I),I=1,3),MEI,NH,FI,SI,IFR
IF (EOF(2) .NE. 0) GO TO 999
NI=NI+1
IF (NI .LE. 20)
+WRITE(5,101)Q2,(C2(I),I=1,3),MEI,NH,FI,SI,IFR
100 FORMAT(F10.0,3F6.0,2I2,2F10.0,I2)
101 FORMAT(1X,F10.2,3F6.1,2I2,2F10.1,I2)
QF2=0.0
SR=0.0
Q2=UNIT(Q2,L2)
SI=UNIT2(SI,L3)
IF (IFR) 30,30,20
20 READ(2,102)QF2,(CF2(I),I=1,3),MER,SR
IF (NI .LE. 20)
+WRITE(5,103)QF2,(CF2(I),I=1,3),MER,SR
102 FORMAT(F10.0,3F6.0,I2,12X,F10.0)
103 FORMAT(1X,F10.2,3F6.1,I2,12X,F10.1)
QF2=UNIT(QF2,L2)
SR=UNIT2(SR,L3)
30 CONTINUE
IF (LQC .EQ. 1) GO TO 95
C
C CALCUL DU DEBIT INDUSTRIEL ACTUEL ET FUTUR RESERVE
C
QAI(2)=QAI(2)+Q2
DO 40 I=1,3
J=I+1
C(2,J)=C(2,J)+C2(I)*Q2
40 CONTINUE
IF (IFR) 50,50,60
50 Q2S=Q2
GO TO 80
60 Q2S=QF2
DO 70 I=1,3
C2(I)=CF2(I)
70 CONTINUE
80 CONTINUE
QFU(6)=QFU(6)+Q2S
DO 90 I=1,3

```



```
60      J=I+11
      CFR(J)=CFR(J)+C2(I)*Q2S
90      CONTINUE
95      CONTINUE
      IF (Q2) 200,200,210
200      XF2=XF2+1
      GO TO 220
210      XF1=XF1+1
220      FT1=FT1+FI
      IF (MEI.EQ. 1) ST1=ST1+SI
      HT=HT+NH
      VI=VI+Q2*365.0
      IF (MEI.EQ. 1) XE1=XE1+1.0
      IF (MEI.EQ. 2) XE2=XE2+1.0
      C
      DO 230 I=1,3
      WI(I)=WI(I)+Q2*C2(I)*0.365
230      CONTINUE
      C
      IF (IFR) 260,260,240
240      VIF=VIF+QF2*365.0
      IF (MER.EQ.1) ST2=ST2+SR
      DO 250 I=1,3
      WFR(I)=WFR(I)+QF2*CF2(I)*0.365
250      CONTINUE
      GO TO 280
260      DO 270 I=1,3
      WFR(I)=WFR(I)+Q2*C2(I)*0.365
270      CONTINUE
      VIF=VIF+Q2*365.0
280      CONTINUE
      GO TO 10
999      CONTINUE
      IF (LOC.NE. 1) QFE(6)=QFU(6)*POINTE
      RETURN
      END
```

```

1  SUBROUTINE LECTC
COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1  SJ,FI,SI,C2,C2(3),UI,
2  MC,MEC,MJ,MEJ,MEI,NH
+ ,IFR,SR,MER,NORO,NOROJ
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
COMMON/CONV/CONVT(3),CONVT2(3)
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YV,YC(3),YU,YF1,YF2
+ ,YF1J,YF1J,FT1J,ST1J
1  YS1,YS2,YFACT,YH,XE1,XE2,XIU,YV6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
UNIT2(S,L4)=S*CONVT2(L4)
NC=0
10 READ(3,100)XJC,MC,MEC,UC,FC,SC
IF (EOF(3) .NE. 0) GO TO 999
NC=NC+1
WRITE(5,101)XJC,MC,MEC,UC,FC,SC
100 FORMAT(F6.0,2I2,F4.0,2F10.0)
101 FORMAT(1X,F6.1,2I2,F4.1,2F10.2)
SC=UNIT2(SC,L3)
C  XFACT=XFACT+XJC
C  XU=XU+UC*XJC
C  IF (MC.EQ.1) XF1=XF1+XJC
C  IF (MC.EQ.2) XF2=XF2+XJC
C  IF (MC.EQ.1) FT1=FT1+FC*XJC
C  IF (MC.EQ.1) FT1J=FT1J+FC*XJC
C  IF (MC.EQ.2) FT2=FT2+FC*XJC
C  IF (MEC.EQ.1) XE1=XE1+XJC
C  IF (MEC.EQ.2) XE2=XE2+XJC
C  IF ((MC.EQ.1).AND.(MEC.EQ.1)) ST1=ST1+SC*XJC
C  IF ((MC.EQ.1).AND.(MEC.EQ.1)) ST1J=ST1J+SC*XJC
C  IF ((MC.EQ.2).AND.(MEC.EQ.1)) ST2=ST2+SC*XJC
C  GO TO 10
999 CONTINUE
RETURN
END

```

```

1  SUBROUTINE LECTJ
   COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1  SJ,FI,S1,Q2,C2(3),UI,
2  MC,MEC,MJ,MEJ,MEI,NH
4  IFR,SR,MER,NORO,NOROJ
   COMMON/DUMM/NC,NJ,NI,L2,L3,LIF,LYN
   COMMON/CONV/CONVT(3),CONVT2(3)
   COMMON/SOM/XFACT,XU,FI1,FI2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
10  +YF1J,YS1J,FT1J,ST1J
1  +YS1,YS2,YFACT,YH,XE1,XE2,XIU,YV6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
   UNIT2(S,L4)=S*CONVT2(L4)
   NJ=0
10  READ(4,100)MJ,MEJ,UJ,FJ,SJ
   IF (EOF(4) .NE. 0) GO TO 999
   NJ=NJ+1
   IF (NJ .LE. 20)
+WRITE(5,101)MJ,MEJ,UJ,FJ,SJ
100  FORMAT(2I2,F4.0,2F10.0)
101  FORMAT(1X,2I2,F4.1,2F10.2)
   SJ=UNIT2(SJ,L3)
20  C
   IF (MJ.EQ.1) XF1=XF1+1.0
   IF (MJ.EQ.2) XF2=XF2+1.0
   XU=XU+UJ
25  C
   IF (MEJ.EQ.1) XE1=XE1+1.0
   IF (MEJ.EQ.2) XE2=XE2+1.0
   C
   IF (MJ.EQ.1) FT1=FT1+FJ
   IF (MJ.EQ.1) FT1J=FT1J+FJ
   IF (MJ.EQ.2) FT2=FT2+FJ
   C
   IF ((MJ.EQ.1).AND.(MEJ.EQ.1)) ST1=ST1+SJ
   IF ((MJ.EQ.1).AND.(MEJ.EQ.1)) ST1J=ST1J+SJ
   IF ((MJ.EQ.2).AND.(MEJ.EQ.1)) ST2=ST2+SJ
   C
35  C
   GO TO 10
999  CONTINUE
   RETURN
   END
40

```



```

1  SUBROUTINE CONTR
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VQU(15),WH(20),
1  VAE,VAI,VAU,VOE,VOI,VZ,PVDEY,PVOIY,PVOUY,POINTE,
2  PVOU(15),VTOU,QAU(5),LSTOP,LFGM,CFR(15),QF2,
3  CF2(3),LQC
5  COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1  SJ,FI,SI,Q2,C2(3),UI,
2  MC,MEC,MJ,MEJ,MEI,NH
+ IFR,SR,MER,NORO,NOROJ
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YU,YC(3),YU,YF1,YF2
+ YF1J,YF1J,FT1J,ST1J
1  YS1,YF2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
COMMON/CON/M,ME,U,F,S,YTC,YTJ,YTI,
15  YPU,YPR,YUU,YUF,YUD,YUQ(3),YUH,YFU1,YPR1,YPRF,YUDF,YUQF(3),YTIF
COMMON/CONV/CONVT(3),CONVT2(3)
LOGICAL INDUST
UNIT(Q,L1)=Q*CONVT(L1)
UNIT2(S,L4)=S*CONVT2(L4)
20  C
TC=0.0
TJ=0.0
TI=0.0
TIF=0.0
C
25  C
C INDUSTRIES
INDUST=.TRUE.
NCART=0
LIP1=LIP-8
REWIND 2
M=1
N=N1
ASSIGN 20 TO IADRES
35  10 READ(2,100)Q2,(C2(I),I=1,3),ME,NH,F,S,IFR,NORO
100  FORMAT(F10.0,3F6.0,2I2,2F10.0,I2,1A9)
IF (EOF(2),NE. 0) GO TO 30
Q2=UNIT(Q2,L2)
S=UNIT2(S,L3)
IF (IFR) 24,24,22
40  22 READ(2,104)QF2,(CF2(I),I=1,3),MER,SR
104  FORMAT(F10.0,3F6.0,I2,12X,F10.0)
QF2=UNIT(QF2,L2)
SR=UNIT2(SR,L3)
24  CONTINUE
45  GO TO 210
20  YTI=YPU+YPR+YUD+YUQ(1)+YUQ(2)+YUQ(3)+YUH+YUF
YTI=YPRF+YUDF+YUQF(1)+YUQF(2)+YUQF(3)
TI=YTI+YTI
50  IF (IFR,EQ. 1) TIF=TIF+YTIF
CALL TABLI(LIP1,NCART)
GO TO 10
C
C CATEGORIES
55  30 INDUST=.FALSE.
YF1=YF1J

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60      YS1=YS1J
        NCART=LIP
        LIP1=LIP-8
        REWIND 3
        I=0
        N=NC
        ASSIGN 50 TO IADRES
        40 READ(3,102)XJC,M,ME,U,F,S
        102 FORMAT(F6.0,2I2,F4.0,2F10.0)
        IF (EOF(3),NE. 0) GO TO 60
        S=UNIT2(S,L3)
        I=I+1
        GO TO 210
        50 YTC=YPU+YPR+YUF+YUU
        TC=TC+YTC*XJC
        CALL IMPRF(I,NCART)
        GO TO 40

75      C
        C INDIVIDUS
        C
        60 NCART=0
        LIP1=LIP-8
        REWIND 4
        N=NJ
        ASSIGN 80 TO IADRES
        I=0
        70 READ(4,103)M,ME,U,F,S,NOR0J
        103 FORMAT(2I2,F4.0,2F10.0,1A9)
        IF (EOF(4),NE. 0) GO TO 90
        S=UNIT2(S,L3)
        I=I+1
        GO TO 210
        80 YPJ=YPU+YPR+YUF+YUU
        TJ=I+YIJ
        CALL TABLE(I,NCART,LIP)
        GO TO 70
        90 CONTINUE
        CALL IMPRB(TC,TJ,TI,TIF)
        RETURN

        C
        C OPEN-CODED SUBROUTINE (210)
        C CALCUL DES FACTURES
        C
        210 CONTINUE
        YPU=0.0
        YPR=0.0
        YUU=0.0
        YUF=0.0
        YUD=0.0
        YUQ(1)=0.0
        YUQ(2)=0.0
        YUQ(3)=0.0
        YUH=0.0
        YPRF=0.0
        YUDF=0.0
        YUQF(1)=0.0
        YUQF(2)=0.0

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```

115      YUQF(3)=0.0
      C
      C COUT DE CHAQUE FACTURE PROPRIETE EAUX USEES(YPU)
      C
      IF (M.EQ.1) YPU=YF1*F/1000.0
      IF (M.EQ.1) YPU1=YF1
      IF (M.EQ.2) YPU=YF2*F/1000.0
      IF (M.EQ.2) YPU1=YF2
      C
      C COUT DE CHAQUE FACTURE PROPRIETE RUISSELLEMENT (YPR)
      C
      IF ((M.EQ.1).AND.(ME.EQ.1)) YPR=YS1*F/100.0
      IF ((M.EQ.1).AND.(ME.EQ.1)) YPR1=YS1
      IF ((M.EQ.2).AND.(ME.EQ.1)) YPR=YS2*F/100.0
      IF ((M.EQ.2).AND.(ME.EQ.1)) YPR1=YS2
      C
      C COUT DE CHAQUE FACTURE USAGER EAUX USEES(YUU)
      C
      IF (INDUST) GOTO 11
      YUU=YU*U
      GOTO 12
115      YUO=YU*Q2*0.365
      DO 13 J=1,3
      YUQ(J)=YC(J)*C2(J)*Q2*0.000365
13 CONTINUE
      YUH=YH*NH
140      12 CONTINUE
      C
      C COUTS DE CHAQUE FACTURE POUR L'USAGE FUTUR RESERVE
      C
      IF ((INDUST).AND.(IFR.EQ.1)) GOTO 14
      GOTO 16
14 YPRF=YS2*SR/100.
      YUDF=YU6*(QF2-Q2)*.365
      DO 15 J=1,3
      YUQF(J)=YC6(J)*.000365*(QF2*CF2(J)-Q2*C2(J))
15 CONTINUE
      C
      C COUT DE FACTURATION
      C
      16 YUF=YFACT
      GO TO IADRES,(20,50,80)
      C RETOUR DE LA SUB 210
      END
      SYSLIB0 PASSE2 80088
      SYSLIB0 INDGR3 80087
      SYSLIB0 CATGR 80088
      SYSLIB0 CONGR 80087

```


GRANDY- US, ACT, ET FUT, - VOL., D.B.O., ET M.S. - FRACTIONNEMENT 4

1	1	2	3	260	1	3.29	3.48	.06	13.32	3.29
2	1	2	3	42	1	0.00	4.23	.08	15.27	3.29
2	1	2	3	45	1	0.00	9.32	.15	27.77	3.29
2	1	2	3	47	1	0.00	.43			
0.00	.17	.29	0.00	.11						
.20	.34	0.00	.15	.31						
	0.00	61000.00								
	0.00	130000.00								
2000.00									0.00	
	1.70	5000.00								
2	3.42	3.29	3.48	.06	20.59					
200.0	0.0	245.0								
488.0	0.0	205.0								
0.0	0.0	0.0								
200.0	0.0	245.0								
0.0	0.0	0.0								
488.0	0.0	205.0								
	101620.02381.0	499.0	1	1	1670760.0	509631.0	0			
	.421920.0	0.0	599.0	1	1	148210.0	2842096.0	0		
	.23	250.0	620.0	80.0	1	1	211380.0	45500.0	0	
	.20	83.3	760.6	165.0	1	1	741340.0	168579.0	0	
	1.78	169.4	568.3	117.0	19926996750.0	17478130.0	0			
5050.0	1	1	2.4	23892.00	10497.00					
1833.0	1	2.4	25605.00	10800.00						
324.0	2	1	0.0	13582.00	49268.00					
531.0	2	2	0.0	6347.00	120339.00					
1	1	1.0	9955.00	4373.60						
1	2	1.0	10580.00	4461.00						
2	1	0.0	1284.00	4373.60						
2	2	0.0	235.38	4461.00						

DONNEES LUES OU GENEREES PAR LE PROGRAMME

DEBITS

FACTEUR DE MAJORATION DU DEBIT MOYEN: 1.70

DEBITS ACTUELS

	A L'USINE		DANS L'INTERCEPTEUR	
	M3/J	MG/J	M3/J	MG/J
		%		%
DOMESTIQUE	12944.7	2.85	12944.7	2.85
INDUSTRIEL	12452.7	2.74	12452.7	2.74
INFILTRATION	13171.8	2.90	13171.8	2.90
USAGE PUBLIC	227.1	.05	227.1	.05
RUISSELLEMENT	50416.2	11.09	77933.2	17.14
TOTAL	89212.4	19.62	116729.4	25.68
		100.0		100.0

UN DEBIT DE 27517.0 M3/J EST DERIVE A L'ENTREE DE L'USINE D'EPURATION

	DEBITS DE CONCEPTION DE L'USINE		DEBITS DE CONCEPTION DE L'INTERCEPTEUR	
	M3/J	MG/J	M3/J	MG/J
		%		%
DOMESTIQUE	15707.8	3.46	34708.5	7.63
INDUSTRIEL	12452.7	2.74	21169.5	4.66
INFILTRATION	16010.6	3.52	35276.2	7.76
USAGE PUBLIC	302.8	.07	567.8	.12
RUISSELLEMENT	57797.0	12.71	105109.5	23.12
TOTAL	102270.7	22.50	196831.4	43.30
		100.0		100.0

DEBIT RESERVE INDUSTRIEL
DE CONCEPTIONDE L'USINE
12452.7 2.74DE L'INTERCEPTEUR
21169.5 4.66

QUALITE DE L EAU

	DBO MG/L	AUTRE MG/L	MS MG/L
DOMESTIQUE	200.0	0.0	245.0
INDUSTRIEL	488.0	0.0	205.0
INFILTRATION	0.0	0.0	0.0
USAGE PUBLIC	200.0	0.0	245.0
RUISSELEMENT	0.0	0.0	0.0
INDUSTRIEL FUTUR RESERVE	488.0	0.0	205.0

REPARTITION DES COUTS DE CONSTRUCTION ET D ENT-OP DE L USINE

COUT AFFECTE PAR ITEM	CONSTRUCTION %	ENT-OP %
VOLUME EGOUT 10	0.0	---
VOLUME USINE 11	17.0	20.0
DBO 12	29.0	34.0
AUTRE 13	0.0	0.0
MS 14	11.0	15.0
DIVERS 15	43.0	31.0
TOTAL	100.0	100.0

SOMMAIRE DES DEPENSES ANNUELLES

OPERATION: RESEAU	\$	0.00
INTERCEPTEUR		130000.00
USINE		678000.00
SOUS-TOTAL	\$	808000.00
AMORTISSEMENT: RESEAU	\$	0.00
INTERCEPTEUR		61000.00
USINE		242000.00
SOUS-TOTAL	\$	303000.00
AMELIORATIONS		0.00
TOTAL	\$	1111000.00

RESULTATS

ALLOCATION DES COUTS USAGER-PROPRIETE-USAGE FUTUR RESERVE

	PROPRIETE	USAGER	USAGE FUTUR RESERVE
COUTS D AMORTISSEMENT			
RESEAU	100.0	0.0	---
INTERCEPTEUR	66.7	33.3	- .0
USINE; VOLUME	66.7	33.3	- .0
EGOUT	62.3	37.7	0.0
DBO	6.6	93.4	0.0
AUTRE	0.0	0.0	0.0
MS	11.6	88.4	0.0
DIVERS	24.2	75.8	0.0
GLOBAL USINE	24.2	75.8	0.0
% GLOBAL D AMORTISSEMENT	32.7	67.3	.0
COUTS D OPERATION			
RESEAU	100.0	0.0	---
INTERCEPTEUR	8.1	91.9	- .0
USINE; VOLUME	3.8	96.2	0.0
DBO	3.8	96.2	0.0
AUTRE	3.8	96.2	0.0
MS	4.8	95.2	- .0
DIVERS	4.8	95.2	- .0
% GLOBAL D OPERATION			
% GLOBAL	12.4	87.6	.0

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[illegible]

PROFIL DES CONTRIBUABLES
=====

5 INDUSTRIES
7742 CONTRIBUABLES DOMESTIQUES OU COMMERCIAUX
=====

7747 CONTRIBUABLES

6890 CONTRIBUABLES USAGERS
857 CONTRIBUABLES NON-USAGERS
=====

7747 CONTRIBUABLES

2366 CONTRIBUABLES,USAGERS OU NON-USAGERS,DESSERVIS PAR UN RESEAU DOMESTIQUE
5381 CONTRIBUABLES,USAGERS OU NON-USAGERS,DESSERVIS PAR UN RESEAU UNITAIRE
=====

7747 CONTRIBUABLES

CRITERES DE FACTURATION
=====

EVALUATION FONCIERE

197377540,00 \$ PROPRIETES- USAGERS
7772344,38 \$ PROPRIETES-NON-USAGERS
=====

205149884,38 \$ TOTAL

SUPERFICIE DRAINEE

6880003,03 M2 PROPRIETES USAGERS
1483353,40 M2 PROPRIETES NON-USAGERS
=====

8363356,43 M2 TOTAL

UNITES DE LOGEMENT

16521 UNITES DE LOGEMENT(DOMESTIQUES ET COMMERCIALES)

DEBIT DOMESTIQUE TOTAL= 12944,7 M3/JOUR
UNITES DE LOGEMENT= 16521
HYPOTHESE SUR LE REJET: 400,0 LITRES/PERS-JOUR

NOMBRE DE PERSONNES/UNITE DE LOGEMENT= 2,0

COUTS UNITAIRES =====

CONTRIBUABLES INDUSTRIELS:	\$/1000 M3= 38,35
	\$/1000 KG DE DBO=137,63
	\$/1000 KG DE MS= 87,40
	\$/UNITE D'ECHANTILLONNAGE= 48,54
USAGE INDUSTRIEL FUTUR :	
	\$/1000 M3= 0,00
	\$/1000 KG DE DBO= 0,00
	\$/1000 KG DE MS= 0,00
CONTRIBUABLES USAGERS	
	\$/\$1000 D'EV. FONC.= ,007
	\$/UNITE DE LOGEMENT= 24,99
	\$/100 M2 DRAINE= ,87
CONTRIBUABLES NON-USAGERS	
	\$/\$1000 D'EV. FONC.= 7,56
	\$/100 M2 DRAINE= 1,20
TOUS LES CONTRIBUABLES	\$/FACTURE= ,26

CATEGORIE 1

5050 CONTRIBUABLES USAGERS SUR RESEAU UNITAIRE

112

DESCRIPTION	COUT UNITAIRE	QUANTITE	COUT
PROPRIETE EAUX USEES EAUX DE RUISSELLEMENT	\$.01 /\$1000 EVALUATION FONCIERE \$.87 /100 M2 DE SUPERFICIE	\$ 23892.00 975.17 M2	\$.16 8.47
USAGE EAUX USEES FACTURATION	\$ 24.99 /UNITE DE LOGEMENT \$.26 /FACTURE	2.40	\$ 59.96 \$.26
TOTAL			\$ 68.84

CATEGORIE 2

1833 CONTRIBUABLES USAGERS SUR RESEAU DOMESTIQUE

DESCRIPTION	COUT UNITAIRE	QUANTITE	COUT
PROPRIETE EAUX USEES EAUX DE RUISSELLEMENT	\$.01 /\$1000 EVALUATION FONCIERE ----- /100 M2 DE SUPERFICIE	\$ 25605.00 1003.32 M2	\$.17 ---
USAGE EAUX USEES FACTURATION	\$ 24.99 /UNITE DE LOGEMENT \$.26 /FACTURE	2.40	\$ 59.96 \$.26
TOTAL			\$ 60.39

CATEGORIE 3

324 CONTRIBUABLES NON-USAGERS SUR RESEAU UNITAIRE

DESCRIPTION	COUT	UNITAIRE	QUANTITE	COUT
PROPRIETE	EAUX USEES EAUX DE RUISSELLEMENT	\$ 7.56 /\$1000 EVALUATION FONCIERE \$ 1.20 /100 M2 DE SUPERFICIE	\$ 13582.00 4577.00 M2	\$ 102.67 \$ 54.98
USAGE	EAUX USEES FACTURATION	\$ 24.99 /UNITE DE LOGEMENT \$.26 /FACTURE	0.00	\$ 0.00 \$.26
TOTAL				\$ 157.91

CATEGORIE 4

531 CONTRIBUABLES NON-USAGERS SUR RESEAU DOMESTIQUE

DESCRIPTION	COUT	UNITAIRE	QUANTITE	COUT
PROPRIETE	EAUX USEES EAUX DE RUISSELLEMENT	\$ 7.56 /\$1000 EVALUATION FONCIERE ----- /100 M2 DE SUPERFICIE	\$ 6347.00 11179.49 M2	\$ 47.98 -----
USAGE	EAUX USEES FACTURATION	\$ 24.99 /UNITE DE LOGEMENT \$.26 /FACTURE	0.00	\$ 0.00 \$.26
TOTAL				\$ 48.24

<-----PROFIL DU CONTRIBUABLE----->				<-----FACTURE----->				CONTRIBUABLE
TYPE DE CONTRIBUABLE	TYPE DE RESEAU	UNITES DE LOGEMENT	EVALUATION FONCIERE	SUPERFICIE (M2)	EAUX USEES	EAUX RUISS, EAUX USEES	USAGER FACTURE	
USAGER	UNITAIRE	1,00	9955,00	406,31	,06	3,53	24,99	28,84
USAGER	DOMESTIQUE	1,00	10580,00	414,43	,07	0,00	24,99	25,31
NON-USAGER	UNITAIRE	0,00	1284,00	406,31	9,71	4,88	0,00	14,84
NON-USAGER	DOMESTIQUE	0,00	235,38	414,43	1,78	0,00	0,00	2,04

=====

BILAN DES DEPENSES PAR POSTE ET DE LA SOMMATION DES FACTURES

=====

DEPENSES PAR POSTE

USAGERS-R	59732.45
USAGERS-C	1283.88
NON-USAGERS-R	17817.01
NON-USAGERS-C	58754.75
VOLUME	355481.43
DBO	435321.75
AUTRE	0.00
MS	182608.73
FACTURATION	2000.00
ECHANTILLONNAGE	5000.00
	=====
	1118000.00

REVENUS

CONTRIBUABLES DOMESTIQUES ET COMMERCIAUX	535207.05
INDUSTRIES	582792.95
	=====
	1118000.00

APPENDIX 5
THE SENSIB PROGRAM IN FORTRAN
WITH SAMPLE RUN

1 PROGRAM SENSIB(TAPE1,TAPE2,TAPE3,TAPE4,OUTPUT,TAPE5=OUTPUT,TAPE6=0
+OUTPUT,TAPE10)

C
C
C
C
C

CE PROGRAMME UTILISE TAREP EN SOUS-ROUTINE POUR MONTRER UN
ECHANTILLON DES RESULTATS (FACTURES) EN FONCTION DES FRACTIONS
CHOISIES POUR LE PARTAGE DES COUTS

LOGICAL LSTOP

COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VBU(15),VOU(15),WH(20),
VAE,VAI,VAU,VDE,VOI,VZ,PVDEY,PVOIY,PVOUY,POINTE,
PVOU(15),VTOU,QAU(5),LSTOP,LPGM,CFR(15),QF2,
CF2(3),LQC

COMMON/CAL/POFU(5),PQFE(5),PQA(5),PVBU(15),

QTAI,QTFU,QTFE,VTRU,VTO,VTA,VT,QTAU
QTAI,QTFU,QTFE,VTRU,VTO,VTA,VT,QTAU

COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN

COMMON/CHO/EXTREM(2,60)

COMMON/CONV/CONVT(3),CONVT2(3)

COMMON/FRA/FRACTS(5,10)

CONVT(1)=1.0

CONVT(2)=3785.0

CONVT(3)=4538.0

CONVT2(1)=1.0

CONVT2(2)=0.0929

CONVT2(3)=4047.0

LSTOP=.FALSE.

25

C LECTURES
C CALL DATA

IF (LSTOP) STOP
WRITE(6,100)(WH(I),I=1,18)

100 FORMAT('1',20A4)

READ (1,101) NESSAI,IPBO

C IPBO=1 SI CONSTRUCTION; IPBO=2 SI ENTOP

101 FORMAT(40I2)

WRITE(5,102) NESSAI,IPBO

102 FORMAT(1H1,40I2)

IF (NESSAI.GT.10) WRITE(5,105)

105 FORMAT('///',' VOUS DEMANDEZ TROP D'ESSAI')

C

NINC=NINC

IF (NINC.GT.60) WRITE(5,106)

106 FORMAT('///',' VOUS DEMANDEZ TROP D'INDUSTRIES OU DE CATEGORIES')

DO 5 I=1,NINC

EXTREM(1,I)=1.0E50

5 EXTREM(2,I)=0.0

DO 90 II=1,NESSAI

READ(1,103) (FRACTS(K,II),K=IPBO,5)

103 FORMAT(16F5.0)

WRITE(5,104) (FRACTS(K,II),K=IPBO,5)

104 FORMAT(1X,16F5.2)

GO TO (20,40),IPBO

20 DO 30 K=1,5

J=K+9

30 PVBU(J)=FRACTS(K,II)

GO TO 60

40 DO 50 K=2,5

J=K+9

55

```
50 PVOU(J)=FRACTS(K,II)
60 CONTINUE
  CALL CALPRE
  IF (LSTOP) STOP
  CALL ALLOC
  IF (LSTOP) STOP
  CALL COUTS
  IF (LSTOP) STOP
  CALL TARIF
  IF (LSTOP) STOP
  CALL LIEN
  CALL SUMM
  CALL CONTR2
70 CONTINUE
  CALL CHOIX (IPBO,NESSAI)
  STOP
  END
```

```
1 SUBROUTINE RETENU(I,YT)
COMMON/CHO/EXTREM(2,60)
C
5 WRITE(10) YT
IF (YT .LT. EXTREM(1,1)) EXTREM(1,1)=YT
IF (YT .GT. EXTREM(2,1)) EXTREM(2,1)=YT
RETURN
END
```



```

1 SUBROUTINE CHOIX(IPBO,NESSAI)
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
COMMON/CHOI/EXTREM(2,60)
COMMON/FRA/FRACTS(5,10)
DIMENSION FACTUR(10,12)
5 I2=NCRET+NIRET
C I0=NESSAI
C DIMENSION LEG(5)
DATA LEG/"DEB. INT.", "DEB. US.", "D.B.O.", "AUTRE", "M.S."
+ , /
C CALCUL DES VARIATIONS EN POURCENTAGE
C
C NINC=NI+NC
DO 10 I=1,NINC
15 EXTREM(1,I)=(EXTREM(2,I)-EXTREM(1,I))*100/EXTREM(1,I)
10 CONTINUE
C CHOIX DES CATEGORIES ET INDUSTRIES INTERESSANTES
C
C IF (NC.EQ. 0) GO TO 22
NCRET=2
IF (NC.EQ. 1) NCRET=1
DO 20 J=1,NCRET
MAX=1
DO 15 I=1,NCRET
15 IF (EXTREM(1,I).GT. EXTREM(1,MAX)) MAX=I
CONTINUE
EXTREM(2,MAX)=EXTREM(1,MAX)
EXTREM(1,MAX)=-77.7
20 CONTINUE
22 CONTINUE
IF (NI.EQ. 0) GO TO 32
NC1=NC+1
NIRET=10
IF (NI.LT. NIRET) NIRET=NI
DO 30 J=1,NIRET
MAX=NC1
DO 25 I=NC1,NINC
25 IF (EXTREM(1,I).GT. EXTREM(1,MAX)) MAX=I
CONTINUE
EXTREM(2,MAX)=EXTREM(1,MAX)
EXTREM(1,MAX)=-77.7
30 CONTINUE
32 CONTINUE
C REPRISE DES FACTURES INTERESSANTES
C
C REMIND 10
WRITE(6,102)(I,I=1,NESSAI)
102 FORMAT(" ",45X,"ECHANTILLON DES FACTURES LES PLUS SENSIBLES",
+ , "O.",12X,"VARIATIONS (%)",
+ , "ESSAI NO.",17X,10I10,/ )
DO 40 K=IPBO,5
40 WRITE(6,101) LEG(K),(FRACTS(K,II),II=1,NESSAI)
101 FORMAT(1X,1A9,17X,10F10.2)
WRITE(6,103)

```

```

103 FORMAT(' ')
NINCRE=NIRET+NCRET
DO 60 I=1,NESSAI
  J2=1
  DO 50 J=1,NINC
    IF (EXTREM(1,J).EQ.-77.7)GOTO 45
    READ(10)
    GOTO 50
  45 READ(10)FACTOR(I,J2)
  J2=J2+1
  50 CONTINUE
  65 CONTINUE
  J2=1
  DO 66 J=1,NINC
    IF (EXTREM(1,J).NE.-77.7) GO TO 66
    EXTREM(2,J2)=EXTREM(2,J)
    J2=J2+1
  66 CONTINUE
  J=1
  DO 310 I=1,NC
    IF (EXTREM(1,I).NE.-77.7) GO TO 310
    WRITE(6,300) J,EXTREM(2,J),(FACTOR(II,J),II=1,NESSAI)
    300 FORMAT(1X,'CAT',I6,F13.2,4X,10F10.2)
    J=J+1
  310 CONTINUE
  REWIND 2
  DO 330 I=NC1,NINC
    IF (EXTREM(1,I).NE.-77.7) GO TO 320
    READ(2,315)IFR, NORO
    315 FORMAT(52X,I2,1A9)
    WRITE(6,316) NORO,EXTREM(2,J),(FACTOR(II,J),II=1,NESSAI)
    316 FORMAT(1X,1A9,F13.2,4X,10F10.2)
    J=J+1
    GO TO 325
  320 READ(2,321)IFR
  321 FORMAT(52X,I2)
  325 IF (IFR.EQ. 1) READ(2)
  330 CONTINUE
C
C  CALCUL DES COTES Z
C
DO 205 J=1,NINCRE
  MOYENN=0
  CARRES=0
  DO 200 I=1,NESSAI
    MOYENN=MOYENN+FACTOR(I,J)
    CARRES=CARRES+FACTOR(I,J)*FACTOR(I,J)
  200 CONTINUE
  MOYENN=MOYENN/LOAT(NESSAI)
  ECARTY=SQRT(CARRES/LOAT(NESSAI)-MOYENN*MOYENN)
  DO 205 I=1,NESSAI
    FACTUR(I,J)=ABS(FACTOR(I,J)-MOYENN)/ECARTY
  FACTUR=COTE Z
  205 CONTINUE
C
C  SOMMATION DES COTES Z
C

```

```

115 IF (NINCRE.EQ.1) GO TO 215
    DO 210 I=1,NESSAI
    DO 210 J=2,NINCRE
        FACTUR(I,1)=FACTUR(I,1)+FACTUR(I,J)
    210 CONTINUE
    215 CONTINUE
    335 WRITE(6,335)(FACTUR(I,1),I=1,NESSAI)
        FORMAT(//,' SOMME DES COTES Z',9X,10F10.2)
C
C CHOIX ET ECRITURE DE LA PLUS PETITE SOMME
C
MIN=1
DO 220 I=1,NESSAI
    IF (FACTUR(I,1).LT. FACTUR(MIN,1)) MIN=I
    220 CONTINUE
    104 WRITE(6,104) MIN
        FORMAT(///,36H NOUS VOUS SUGGERONS VOTRE ESSAI NO.,I3)
    RETURN
END

```



```

1  SUBROUTINE CONTR2
COMMON/DAT/QAI(5),QFU(6),QFE(6),C(5,15),VRU(15),VOU(15),VH(20),
1  VAE,VAI,VAU,VOE,VOI,VZ,PVEY,PVOIY,PVOUY,POINTE,
2  F'YOU(15),VTOU,QAU(5),LSTOP,LFGH,CFR(15),QF2,
3  CF2(3),LQC
5  COMMON/DAT2/XJC,UC,FC,SC,UJ,FJ,
1  SJ,FI,SI,Q2,C2(3),UI,
2  MC,MEC,MJ,MEJ,MEI,NH
10  +,IFR,SR,MER,NORO,NOROJ
COMMON/DUMM/NC,NJ,NI,L2,L3,LIP,LYN
COMMON/SOM/XFACT,XU,FT1,FT2,ST1,ST2,XF1,XF2,HT,YV,YC(3),YU,YF1,YF2
15  +,YF1J,YS1J,FT1J,ST1J
1  YS1,YS2,YFACT,YH,XE1,XE2,XIU,YU6,YC6(3),WI(3),WT(3),WFR(3),VI,VIF
1YPU,YPR,YUU,YUF,YUD,YUQ(3),YUH,YPU1,YPR1,YPRF,YUDF,YUQF(3),YTIF
COMMON/CONV/CONVT(3),CONVT2(3)
20  60 EST NI+NC
COMMON LOGICAL INDUST
UNIT(Q,L1)=Q*CONVT(L1)
UNIT2(S,L4)=S*CONVT2(L4)
25  TC=0.0
TJ=0.0
TI=0.0
TIF=0.0
C  CATEGORIES
C  INDUST=.FALSE.
30  NCART=0
LIP1=LIP-8
REWIND 3
I=0
N=NC
35  ASSIGN 50 TO IADRES
40  READ(3,102)XJC,M,ME,U,F,S
102  FORMAT(F6.0,2I2,F4.0,2F10.0)
IF (EOF(3).NE.0) GO TO 30
S=UNIT2(S,L3)
I=I+1
40  GO TO 210
50  YTC=YPU+YPR+YUF+YUU
TC=TC+YTC*XJC
CALL RETEND(I,YTC)
GO TO 40
45  C  INDUSTRIES
C  30  INDUST=.TRUE.
NCART=0
LIP1=LIP-8
I2=0
REWIND 2
M=1
N=NI
55  ASSIGN 20 TO IADRES
10  READ(2,100)Q2,C2(1),I=1,3),ME,NH,F,S,IFR,NORO

```

```

100 FORMAT(F10.0,3F6.0,2I2,2F10.0,I2,1A9)
   IF (EOF(2) .NE. 0) GO TO 999
   I2=I2+1
   Q2=UNIT(Q2,L2)
   S=UNIT2(S,L3)
   IF (IFR) 24,24,22
22 READ(2,104)QF2,(CF2(I),I=1,3),MER,SR
104 FORMAT(F10.0,3F6.0,I2,12X,F10.0)
   QF2=UNIT(QF2,L2)
   SR=UNIT2(SR,L3)
24 CONTINUE
   GO TO 210
70 YTI=YPU+YPR+YUD+YUQ(1)+YUQ(2)+YUQ(3)+YUH+YUF
   YTI=YPRF+YUDF+YUQF(1)+YUQF(2)+YUQF(3)
   TI=YTI+YTI
   IF (IFR .EQ. 1) TIF=TIF+YTI
   IF (IFR .EQ. 1) YTI=YTI+YTI
   CALL RETENU(I2+NC,YTI)
   GO TO 10
999 CONTINUE
      RETURN
C
C OPEN-CODED SUBROUTINE (210)
C CALCUL DES FACTURES
C
210 CONTINUE
   YPU=0.0
   YPR=0.0
   YUU=0.0
   YUF=0.0
   YUD=0.0
   YUQ(1)=0.0
   YUQ(2)=0.0
   YUQ(3)=0.0
   YUH=0.0
   YPRF=0.0
   YUDF=0.0
   YUQF(1)=0.0
   YUQF(2)=0.0
   YUQF(3)=0.0
C
C COUT DE CHAQUE FACTURE PROPRIETE EAUX USEES(YPU)
C
   IF (M.EQ.1) YPU=YF1*F/1000.0
   IF (M.EQ.1) YPU1=YF1
   IF (M.EQ.2) YPU=YF2*F/1000.0
   IF (M.EQ.2) YPU1=YF2
C
C COUT DE CHAQUE FACTURE PROPRIETE RUISSELLEMENT (YPR)
C
   IF ((M.EQ.1).AND.(M.EQ.1)) YPR=YS1*S/100.0
   IF ((M.EQ.1).AND.(M.EQ.1)) YPR1=YS1
   IF ((M.EQ.2).AND.(M.EQ.1)) YPR=YS2*S/100.0
   IF ((M.EQ.2).AND.(M.EQ.1)) YPR1=YS2
C
C COUT DE CHAQUE FACTURE USAGER EAUX USEES(YUU)
C

```


GRANBY- US. ACT. SEULEMENT- VOL. ET D.B.O.- SITE 1

1	1	2	3	260	2	3.29	3.48	.06	13.32	
2				3.42		0.00	4.23	.08	15.27	3.29
2				4.15		0.00	9.32	.15	27.77	5.59
2				9.17		0.00				
0	0.00	.31	.26	0.00	0.00	.43				
.23	.46	0.00	0.00	.31						
	0.00	0.00	61000.00	242000.00						
	0.00	130000.00	678000.00	0.00						
2000.00	5000.00								0.00	
1	1.70									
2	3.42	3.29	3.48	.06	20.59					
200.0	0.0	245.0								
488.0	0.0	205.0								
0.0	0.0	0.0								
200.0	0.0	245.0								
0.0	0.0	0.0								
488.0	0.0	205.0								
	101620.02381.0	499.0	1	1	1670760.0	509631.0	0			
	.421920.0	0.0	599.0	1	1	148210.0	2842096.0	0		
	.23	250.0	620.0	80.0	1	1	211380.0	45500.0	0	
	.20	83.3	760.6	165.0	1	1	741340.0	168579.0	0	
1	178	169.4	568.3	117.0	19926996750.0	17478130.0	0			
5050.0	1	1	2.4	23892.00	10497.00					
1833.0	1	2	2.4	25605.00	10800.00					
324.0	2	1	0.0	13582.00	49268.00					
531.0	2	2	0.0	6347.00	120339.00					
1	1	1.0	9955.00	4373.60						
1	2	1.0	10580.00	4461.00						
2	1	0.0	1284.00	4373.60						
2	2	0.0	235.38	4461.00						

ECHANTILLON DES FACTURES LES PLUS SENSIBLES

3	1	.31	.26	0.00	.43
0.00	.26	.30	0.00	.44	
0.00	.41	.16	0.00	.43	

VARIATIONS (%)

ESSAI NO.	1	2	3
DEB. INT.	0.00	0.00	0.00
DEB. US.	.31	.26	.41
D.B.O.	.26	.30	.16
AUTRE	0.00	0.00	0.00
M.S.	.43	.44	.43
CAT	74.44	73.45	76.57
CAT	61.84	62.34	61.01
INDUS	55930.77	57029.40	53497.67
INDUS	271045.31	276507.71	258976.59
INDUS	33417.64	33632.28	32887.04
INDUS	22119.83	22119.99	22191.83
AUTRES	252021.95	250523.43	254899.63
SOMME DES COTES Z	1.39	4.33	5.64

NOUS VOUS SUGGERONS VOTRE ESSAI NO. 1

CA1 EP 59082E7E

Canada. EPS. WPCD.

EPS-WP-80-7E

A METHOD FOR WASTEWATER TREATMENT SYSTEM USER C
ALLOCATION. VOLUME 2. USER'S MANUAL. 1982.

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